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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A Great Exhibition

THE advance notices we publish this week of the exhibits at the Chemical Plant Exhibition to be opened by Sir Harry McGowan next Monday at the Central Hall, Westminster, give a fair idea of the representative character of the exhibits. In our next issue we hope to publish further details of considerable interest respecting new plant, together with articles, giving their critical impressions of the whole exhibition, contributed by Mr. A. Grounds (of Huntington, Heberlein and Co.) and Mr. P. Parrish (South Metropolitan Gas Co.). For the moment it must suffice to congratulate the chemical plant manufacturers on the public spirit with which they continue to respond to any call in aid of British products. An exhibition of this character is expensive and involves considerable labour, and it is to the credit of the firms concerned that they are so ready to bear the burden involved in the interests of the industry. The exhibition organised during the chemical week in London a few years ago surprised and impressed everyone who saw it. Next week's exhibition, we have every reason to believe, will be even better, and in a week of interesting fixtures will probably remain the most permanently important feature of the week.

The jubilee meetings next week of the Society of Chemical Industry, in association with which the exhibition is being organised by the Association of British Chemical Manufacturers, will have three outstanding features—Sir Harry McGowan's presidential address, the presentation to Dr. Herbert Levinstein of the Society's Medal for distinguished services to chemical science, and the annual business meeting itself. There is much of interest besides, of course—a very full round of visits to chemical works, a number of technical papers and discussions, and a generous programme of meals, receptions, and parties of one kind and another. Most of these, naturally, are mainly of domestic interest to the members, who will no doubt fully appreciate the varied and interesting programme provided for them during their week's stay in London.

"Drikold"—the New Dry Ice

WE have more than once of late noted the development in the United States and elsewhere of the use of dry ice, a form of solid carbon dioxide, which marks an immense advance as a refrigerant upon ordinary ice. In America it is usually produced in the form of "snow," and the great installation of Industrial Solvents, Ltd. at Hull includes a small plant for its production. Imperial Chemical Industries have now produced at their Billingham works a solid form of CO_2 which, it is claimed, has distinct advantages over the "snow" form, and which is about to be placed on the market. In appearance the solidified CO_2 resembles a bar or block of salt. It has a temperature of 144 degrees of frost; is half as heavy again as water; is very easily handled, since it is dry, ultimately evaporates (like a domestic camphor ball) and leaves no wet while in use or residue after complete evaporation.

At a demonstration at Imperial Chemical House this week, Captain Fraser exhibited the new refrigerant in different forms and explained the almost endless possibilities in its application as a refrigerant. One of the most obvious uses is in the transport of fish, meat, dairy produce, and the like; for in addition to being a powerful and rapid refrigerant, it occupies but little space, and has the advantages of not liquefying and of leaving no residue. But beyond this there are almost infinite possibilities in the domestic sphere. The ordinary refrigerating machine or cabinet is, of course, a small chemical plant, which can be put in operation at will to produce the requisite cold condition. In the case of "Drikold" there is no chemical process to be set in motion; all that is required is a cabinet, practically a closed cupboard, and a small quantity of the dry ice introduced into the cabinet keeps the meat, fruit, milk or other contents at the desired temperature. Although no actual figures are available, it is claimed that the dry ice method of

refrigeration should prove a distinct economy. It involves no costly freezing apparatus and therefore no current for running; the only cost is the purchase of the solid CO_2 itself and the provision of a plain cabinet. If efficiently insulated, a supply may last as long as three months, for the solidified CO_2 only exerts its freezing properties as it evaporates, producing a thin whitish vapour which is described as non-poisonous to foodstuffs and odourless. Evaporation can be controlled to give moderate or low temperatures and these temperatures can be steadily maintained.

In THE CHEMICAL AGE of April 25, 1931, we published a fairly full description of the manufacture of dry ice by Mr. Grimwade, the managing director of Carba Dry Ice (Australia), Ltd. It is the Carba process, we understand, that has been acquired and is now being worked at Billingham. It is expected that the initial production will be absorbed by the requirements of large scale industrial users, and the domestic market will be approached later. Imperial Chemical Industries, we understand, do not contemplate retail distribution; the intention is to supply in units of moderate bulk, and to rely for retail distribution upon retail agencies.

Corrosion—A World Problem

A RESEARCH summary made public by the American Chemical Society indicates the world-wide range of the corrosion problem. In the oil industry, for example, corrosion is exacting an annual toll of one per cent. a gallon of the gasoline produced at present. Losses, direct and indirect, in this industry alone are estimated at $125,000,000 and upwards every year. Heavy damage is sustained by industry in general, and cities are facing an acute problem in the corrosion of water lines. Research is trying to develop the best and most economical all-round steel for service in the oil fields. The problem of metallic stability and stabilisation at temperatures between 1,000 and 1,400° F. is being investigated in the laboratory of the United States Steel Corporation and in other laboratories with promising results. In England, it is mentioned, a joint committee of the Iron and Steel Institute, and the National Federation of Iron and Steel Manufacturers are conducting extensive field tests on the corrosion of copper steels under different atmospheric conditions, rural, marine, urban and industrial.

Two main committees have been formed by the American Petroleum Institute to work out the best means of prevention. One of these deals with transportation and production, and the other handles refinery and marine problems. Probably 150 or 200 men in the oil industry are devoting most of their time to this work. Much has been accomplished toward a better understanding of the complicated soil corrosion problem, and toward the manufacture and application of more durable coatings for use underground. Better paints and lacquers are declared to be a notable achievement of recent research. About $100,000,000 is spent annually on coating materials for use out of doors. Developments in the manufacture of synthetic resins promise to give new coatings that are tough and resistant to many chemicals, and yet not out of reach in price.

Protective measures have proved to be of vital importance as affecting profits in oil refining. New resistant alloys, chemical treatment of the crude oil, and protective coatings have proved effective. A net annual saving of $24,160 was obtained on a 10,000-barrel still by neutralisation with ammonia and lime. The life of steel exposed to atmospheric corrosion outdoors has been increased from two to five times by the addition of 0·25 per cent. copper at an average increase in cost of $3 per ton, or about 5 per cent. Steam-boiler and hot-water piping corrosion in large stationary plants, and even in locomotives, may now be practically eliminated or kept under control by efficient de-aeration and water conditioning.

Corrosion from refrigerator brine and in circulating water systems has been brought under close control by the proper use of sodium dichromate and other film-forming inhibitors at a very small cost, compared with the large annual saving of equipment. Industrial water engineers, it is pointed out, now recognise that water supplies require treatment to prevent corrosion as well as for hygienic reasons. Methods of analysis and expression of results are, however, not yet standardised with respect to the former problem. A movement is on foot in the American Society for Testing Materials to develop and standardise the methods of analysis of water for domestic and industrial uses. Water supplies in many localities, it is asserted, are becoming more corrosive both by pollution and by chemical treatment and filtration.

Books Received

CHEMISCHE BINDING ALS ELEKTROSTATISCHE ERSCHEINUNG. By A. E. van Arkel and J. H. de Boer. Leipzig: S. Hirzel. Pp. 320. Price RM.15.

PATENT LAW FOR CHEMISTS, ENGINEERS AND EXECUTIVES. By Fred H. Rhodes. London: McGraw-Hill Publishing Co., Ltd. Pp. 207. Price 12s. 6d. net. [This book relates to United States Patent Law.—ED.]

F.B.I. REGISTER OF BRITISH MANUFACTURERS, 1931–32. London Federation of British Industries. Pp. 500.

The Calendar

July		
13	Chemical Plant and Research Instruments Exhibition: Opening 11.30 a.m.	Central Hall, Westminster, London.
14	Society of Chemical Industry Annual General Meeting. Presidential Address by Sir Harry McGowan. 10.30 a.m.	Royal Academy of Music, Marylebone, London.
14	"Recent Developments of the Society of Chemical Industry in Basle." Dr. G. Engi. 7 p.m.	Salters' Hall, St. Swithin's Lane, London.
14	"Dust Explosions." Professor R. V. Wheeler. 9 p.m	Home Office Industrial Museum, Horseferry Road, London.
15	Presentation of S.C.I. Medal to Dr. Herbert Levinstein. 10.30	Royal Academy of Music, London.
15	S.C.I. Annual Dinner. 7 p.m. ..	Wharncliffe Rooms, Great Central Hotel, London.
16	"Hydrogen Ion Concentration." Dr. H. Sörensen. 10.30 a.m.	Leathersellers' Hall, St. Helen's Place, London.
16	Discussion on "Smoke Abatement." 3.15 p.m.	71, Eccleston Square, Westminster.
16	Institute of Fuel. Discussion. 10.30 a.m.	Great Central Hotel, London.
17	Colour Users' Association: Annual General Meeting. 12 noon	Cromwell Buildings, Blackfriars Street, Manchester.

British Chemical Plant Exhibition

Central Hall, Westminster, July 13-18

THE British Chemical Plant Exhibition, which is being arranged by the British Chemical Plant Manufacturers' Association and the Chemical Engineering Group, opens at the Central Hall, Westminster, on Monday, July 13, at 11.30 a.m. The opening ceremony will be presided over by Sir Harry McGowan, president of the Society of Chemical Industry, which is simultaneously holding its Jubilee Celebrations in London.

Progressive Developments in British Chemical Plant

This exhibition is being staged to indicate the great progress which has been made in British chemical engineering during recent years and the numerous technical achievements which stand to its credit. Since the last exhibition in 1926, the trend of industrial development has shown almost indisputably that the prosperity of this country is becoming more and more dependent upon chemistry, which is now the underlying foundation of many of our industries. The existence of highly efficient chemical plant is therefore of outstanding importance for future progress, more especially as many branches of present-day industrial activity are only possible by the use of plant and equipment which is similar in construction or principle to that directly associated with the manufacture of chemicals as raw material for industrial processes. It has only been during the post-war period that chemical engineering has developed to this degree and has now reached the status of a science. Hitherto, a considerable proportion of the plant in use was designed by rule-of-thumb methods, with a limited amount of practical experience in the actual performance of plant units to balance the shortcomings of anticipated results. To-day, it is possible to work along purely theoretical grounds and yet find that the completed plant in practice does not fall far below what is expected of it. That is where modern methods of research have played their part. With the introduction of new alloys of excellent acid-resisting and heat-resisting properties—the outcome of tedious and persistent metallographic research—it has become possible to attack old problems anew. Materials of construction of diverse origin, such as acid-resisting stoneware, fused silica, hard and soft rubber, enamelled iron, and a range of plastic products, have also been pressed into service, for in some cases the needs of the chemical engineer are very exacting. New methods of construction, too, have played important rôles in the modernisation of process industries. Considerable attention has been directed to the planning of plant which is compact and yet easily accessible to all parts of the various units assembled together, and in attaining this desirable feature the design of the individual plant units and fittings has demanded much forethought. General utility and adaptation is another point which has been given close attention by the plant manufacturers.

Much of the plant at this British Chemical Plant Exhibition is being publicly shown for the first time. Other units have notable improvements or modifications to the design which fully justifies a lengthy and detailed inspection, for many of these improvements can add greatly to the efficiency of the plant under practical working conditions. Those items which are neither new nor presented in improved form may be welcomed by some of us as tried and trustworthy friends, which have already faithfully served the chemical and chemical-using industries in many ways and have, in no small degree, contributed to the development and ultimate success of these industries. The informal interchange of ideas and information is one of the pleasantest and most useful functions of an exhibition such as this, which remains open from July 13 to July 18, from 9.30 a.m. to 6.30 p.m. daily, with an extension on Tuesday, July 14, and Friday, July 17, till 8 p.m. and 8.30 p.m. respectively.

The Aluminium Plant and Vessel Co., Ltd.

[STAND NOS. A1 AND A9.]

AMONG the novel items being shown by the Aluminium Plant and Vessel Co., Ltd., is an example of the A.P.V. Sommer plant for enamel oil and ester gum. The advantage of this plant to some manufacturers is that one plant can be arranged to make both enamel oils and ester gums, as a charge of linseed oil can first be cooked to the desired consistency, and emptied into storage tanks and then, without cleansing the kettle, a charge of resin can be esterified.

A bulk transport tank to a new patented design is also shown. Here the principle is applied of mounting the tank flexibly on the chassis by means of elastic bearings, which have given excellent service in many other directions. By these means a lighter tank and mounting are made possible, for when the utmost rigidity has been sought very heavy mountings, iron bearers and cradles have been necessary. Hitherto these have been particularly necessary with aluminium tanks, and now for the first time the Aluminium Plant and Vessel Co.'s design makes it possible to carry such tanks without heavy supports. For tanks where internal fittings must be avoided, as in the case of milk and beer, the aluminium tank is fitted with external steel bands carrying specially designed supporting blocks which are bolted to the chassis through flexible mountings, and in insulated tanks these bands are concealed by the outer casing. Where internal supports are not objectionable, however, as in the transport of petrol, oils and acids, the load is transmitted by welding in a hollow strut carrying a pad which is bolted to the chassis through flexible mountings. This principle of construction has been found to give smooth running over the worst road surfaces even when the tank is only partly filled.

The economy of aluminium tanks may be appreciated from the following facts. An aluminium tank generally weighs rather less than half a steel tank. Taken at its lowest this means lower petrol consumption, increased life of tyres, and a reduction in wear and tear on the chassis. For example, with a total permissible load on a given chassis of three tons for both tank and contents, it is possible to get a 20 per cent. greater useful load with an aluminium than with a steel tank. In other cases where the maximum useful load is already being carried, a smaller or lower priced chassis can be used with a reduction in first cost and greatly diminished running expenses. For example, with a four-compartment transport tank holding five tons of petrol, the reduction in weight by

using aluminium in place of steel, permits of a saving of £200 in chassis price.

Other exhibits at this stand include a stainless steel steam jacketed pan, with copper jacket, an entirely new feature; a new patent counterpoised cover for a steam jacketed pan;

WELDED STAINLESS STEEL JACKETED STILL.
(ALUMINIUM PLANT AND VESSEL CO., LTD.)

and a wide range of chemical plant in metals which have not been very often used for the purpose, principally pure nickel, monel and stainless steel. They are also exhibiting a piece of welded copper plant which it is believed to be entirely novel in that the welding process has not previously been shown with copper.

Babcock and Wilcox, Ltd.

[STAND NO. A18.]

THE exhibit of Babcock and Wilcox, Ltd., is designed to show how, apart from their main product of boiler plant equipment, the Babcock organisation can be of service to the chemical industry in respect of "service" and the "supply of materials."

Under the heading of "service" their exhibits comprise samples of deep pressings and photographs of larger stainless steel products, intended to show how the highly specialised machinery and equipment of their shops, coupled with the high degree of skill on the part of their staff, can produce equipment which is ordinarily somewhat troublesome, for deep pressings not only require sound knowledge of the design of suitable dies and the use of highly specialised machinery, but also a close control of the heat, especially when working with stainless steel.

Value to the chemical industry, in-so-far as materials are concerned, is demonstrated by the Calorizing Corporation of Great Britain, Ltd., an associated company, in the exhibit which this latter company is displaying on the Babcock and Willcox stand. Here calorized pressed steel boxes and pots for case-hardening, annealing, and cyanide, lead and salt hardening are exhibited; also calorized solid drawn steel pyrometer sheaths. Calorizing, it will be remembered, is a patented process, and consists of driving aluminium into the surface of mild steel or cast iron, to form a ferro-aluminium alloy. Upon subjection to heat, a thin, tightly adhering film of aluminium oxide is then formed on the surface of the metal, affording complete protection from oxidation to the underlying steel, at temperatures up to 950° C., and, in addition, immunity to attack by gaseous sulphur products. Calorized steel, therefore, consists of two important component parts, the underlying body of steel, possessing sufficient strength to withstand the strain imposed upon it, and a surface ferro-aluminium alloy capable of maintaining this strength intact.

Plain steel containers for heat treatment and pyrometer sheaths rapidly deteriorate when subjected to operation temperatures, at which the external surface commences to scale. The accumulated scale presents a great disadvantage in retarding the transfer of heat to the interior thereby, in the case of the heat treatment containers, increasing the length of time of the heat treatment operation, and in the case of pyrometer sheaths, causing lag in the temperature readings. These disadvantages, however, can be overcome by the use of calorized mild steel.

This firm is also now manufacturing a high temperature and corrosion-resisting alloy, under the name of "Calmet." This alloy is of the chromium-nickel-aluminium class, and is available in cast form specially developed for the supply of castings to withstand loads at high temperatures up to 1,150° C. To meet these conditions, it has the valuable property of resistance to oxidation under action of flame and hot gases from the products of combustion from ordinary fuels; is unattacked by the sulphur compounds contained in such gases; and does not become brittle under service conditions. Case-hardening and annealing boxes and pots, and pyrometer sheaths, constructed in "Calmet" are exhibited.

Baird and Tatlock (London), Ltd.

[STAND NO. B35.]

A COMPREHENSIVE range of apparatus applicable to research and routine analysis in the modern industrial laboratory is being shown by Baird and Tatlock (London), Ltd., several of the instruments, including the Vogel water still and Burstin vacuum still, being shown for the first time.

The Vogel still is constructed entirely of metal, except for the conductivity water containers, which are of Pyrex glass, and the various parts are connected by screw unions, thus rendering all such parts easily accessible. It operates with ordinary distilled water, and can be made to yield water of specific conductivity, 0·8, "equilibrium water," 1·2, or 1·5 Gemmho at 25° C. as desired. Its capacity is about eight litres of conductivity water per day. The method of working is simple, and, when once set into operation, requires very little attention. A special container of Pyrex glass has also been designed in which any grade of conductivity water can be kept for months without appreciable change. This still and conductivity water container will, therefore, form a welcome addition to the equipment of works and research laboratories.

The Burstin vacuum still, which is already extensively used for the continuous distillation of crude residues in vacuum, such as crude oil, naphthenes and phenols, has recently found wider application in the distillation of foaming or unstable liquids. Overheating of the higher boiling constituents is entirely obviated owing to the large heating surface and the ample evaporating space provided in this still. A valuable feature is that steam or inert gases can be introduced during the distillation if desired.

Amongst other special apparatus, particular attention might be drawn to the B.T.L. stainless steel bomb calorimeter, which embodies many new and original features.

Bakelite, Ltd.

[STAND NO. A20.]

BAKELITE products in many forms are exhibited at this stand. They comprise varnish for electrical insulation and protection of chemical plant; protective enamel; liquid cements for the preparation of steam and chemical joints in pipe lines, and for bonding propositions; paper of fabric filled sheet for constructional purposes; gears and pinions which are not attacked by chemical liquids; lacquers for application to surfaces leaving behind a thin protective coating; oil soluble resins for incorporation in air drying or stoving varnishes; spirit soluble resins for incorporation in compositions as a binding medium; and moulding materials for shaping under heat and pressure into finished mouldings by mass production methods. In the case of the liquids, solid resins, insulating varnish, protective enamel, lacquers and cements, these are all supplied in a form which require a low temperature heat treatment to produce final hardness, and as such are convenient forms for bringing the final resin to the composition required before hardening to its final state.

Various grades of varnishes can be supplied, each having some special feature which makes it convenient to employ, according to the process suggested, or which impart some special property in the final product. They contain volatile solvents (chiefly methylated spirit) and, after application, require to be stoved to a temperature of about 135° C. to harden the residual resin and to render it chemically inert. The residual film is not attacked by weak mineral acids, organic acids or volatile solvents. Included in this range of Bakelite varnishes is a cold hardening varnish (A 37), which can be satisfactorily applied to woodwork to resist chemical attack. This is useful for protecting the structural woodwork of units on chemical plant, included in which are the ventilation ducts or cowls over etching vats in glass works, various wooden frame-works in artificial silk works, etc.

Among the liquid cements are viscous liquid products which are successfully employed in the production of steam and chemical joints in pipe lines. After hardening by the heat of a steam passing through the joint at atmospheric pressure, a seal is produced which is extremely durable. The cement is economical to employ on account of the small quantity required for each joint. If it is used for making joints through which various chemicals pass, it can be heated from the outside by a blow-pipe, or other convenient means so that the cement reaches a temperature of about 130° C.

Gears and pinions cut from Bakelite fabric-filled blanks are not only unaffected by many reagents which prevent the employment of metal gears, but are, in addition, long wearing and silent in running. Metal shrouds are not necessary with Bakelite gears, thus giving a maximum width of tooth face. They solve many difficult questions of drive on chemical plants and machines where the gears are required to run under unfavourable conditions. They can be run in high temperatures up to about 120° C. without shrinking or becoming destroyed mechanically.

Bennett, Sons and Shears, Ltd.

[Stand No. B3.]

At this stand will be found patent "mulsers" for homogenising emulsions; solvent extraction apparatus of both laboratory and commercial types for the extraction of drugs; a jacketed copper vacuum still and condenser complete with vacuum receivers, auxiliary condenser and dry vacuum pump. This latter exhibit is largely used by manufacturing chemists for concentrating, distilling or drying at low temperatures, for food products and for re-distillation of essential oils, etc. A range of small high-pressure autoclaves is also shown.

Birmal Chemical Engineers

[Stand No. B36.]

This exhibit comprises plant and equipment fabricated in aluminium and special aluminium alloys for the chemical and food manufacturing industries. Such plant is now very widely used in the making of acetic acid, artificial silk, nitric acid, varnishes and lacquers, pharmaceutical products, rubber, beer and cider, edible oils, margarine, and foodstuffs.

Prominent among the exhibits are certain pieces of equipment constructed in the special corrosion-resisting alloy "Birmabright," which, whilst having been used for some time for cast fittings, has recently been produced in the wrought forms, such as rolled sheet, extruded sections and tubing. This alloy, in these forms, possesses high mechanical strength; it is approximately two and a half times as strong as pure aluminium, and is of the same specific gravity. It can be worked in a similar manner to pure aluminium and can be welded; wrought and welded vessels can therefore be constructed. The specially high corrosion- and chemical-resisting properties in the cast form are to be found with the wrought form, and this represents a new and important advance in aluminium alloy development.

An example of storage tank construction in welded aluminium is being shown. This tank is of smooth interior finish, provided with inlet connection, suction outlet, bottom drain, manhole and lid and level gauges, all of these fittings being made in Birmabright alloy. To demonstrate the fabrication of equipment in wrought Birmabright alloy, a 500 gallon capacity road transportation tank is shown. This tank is constructed throughout in welded Birmabright alloy sheet and complete with fittings it weighs only 225 lb., compared with 610 lb. for a mild steel tank of similar capacity.

Included among other exhibits is an improved design in steam-jacketed aluminium boiler pan, arranged for tilting, with all fittings and connecting pipes eliminated from the exterior of the aluminium jacket. The interior and exterior surfaces of this pan and jackets are of smooth finish, ensuring ease of cleaning and maintenance of hygienic conditions for foodstuffs manufacture. The usual type of varnish boiling pan with aluminium body supported by mild steel framework, shown alongside, is fitted with a detachable bottom piece wrought in Birmabright alloy sheet. Valves, cocks, level gauges, etc., embodying castings in Birmabright alloy, are being displayed in great variety.

British Chemical Plant Manufacturers' Association

[Stand No. A8.]

The stand occupied by the British Chemical Plant Manufacturers' Association is principally intended as a clearing house for general enquiries, and visitors who have any difficulty in any particular, should seek the assistance of the staff in attendance. The Official Directory of the Association, to which visitors' notice has been drawn through other channels, will be available for gratis distribution to genuine enquirers for chemical plant.

Thomas Broadbent and Sons, Ltd.

[Stand No. A12.]

This exhibit comprises a small-scale working model of a continuous self-discharging centrifugal separator, for treating slurry of all kinds, containing up to 10 per cent. of fine solids.

This machine has two baskets, rotating at different speeds. The outer basket, which is mounted on the main spindle, is of the imperforate type, and rotates at 920 r.p.m.; the inner basket carries a removable spiral, and rotates at 887 r.p.m. in the same direction. The main spindle is hollow, and carries a stationary pinion shaft, and the variation in speeds is obtained by internal gears. The slurry is fed down a funnel, and falls on to the top of the inner basket, from where it is discharged through ports, and collected in the outer imperforate basket. The solid contents of the slurry are precipitated on the inner wall of this basket, and conveyed in a downward direction by means of the spiral, and eventually discharged through port holes. The solids are then collected by a scraper drum, and ejected from the machine through a chute. The clarified liquor is discharged over a spilling lip of the outer basket into the liquor chamber, and discharged through the outlet pipe. A machine of this type is treating coal slurry containing about 10 per cent. solids, at the rate of 2,000 gallons per hour. During a recent test, the effluent water was found to contain not more than 1 per cent. of solid matter. The recovered coal dust has a moisture content of about 20 per cent. as delivered from the machine.

This machine is of robust construction, very compact, and is belt-driven. It has been put to very severe tests before being placed on the market, and has many commendable features not to be found in any other type of self-discharging centrifugal. There are certainly great possibilities for it in the chemical industry, as it is adaptable for treating a large variety of chemical products at a very rapid rate.

It is interesting to note that Thomas Broadbent and Sons have also recently placed on the market a continuous self-discharging drier for de-watering solid material up to a size capable of passing through about 1 inch mesh. A 36 inch machine of this type is giving the greatest satisfaction in a colliery, for dealing with washed coal. The coal is treated at the rate of 30 tons per hour, moisture being reduced from 28 per cent. to 7-8 per cent.

Brown Bayley's Steel Works, Ltd.

[Stand No. A17.]

Intensive research at Brown Bayley's Steel Works, Ltd., has enabled two troublesome difficulties to be overcome. Generally speaking, plant is constructed by either welding or

riveting processes. On mechanical grounds, the austenitic chromium nickel corrosion-resistant steels are ideal for welding processes, as they retain their great toughness when made coarsely grained. Unfortunately, however, it has been absolutely essential in the past to heat-treat all welded equipment after the welding operations were completed, in order to prevent the steel being subject to a very dangerous form of intergranular attack near the welded joints. This attack is known to many people as "weld-decay," and it is due to the precipitation of an intergranular film of carbide when the steel is heated to 500/900° C. The trouble is removed entirely by heat treatment, but the latter is frequently inconvenient, and, in the case of large plant, generally impracticable. The special steel exhibited here and known under the name of "Weldanka," is free from this troublesome defect, in consequence of which plant in which it is used does not require heat treatment after welding.

The further difficulty mentioned concerned the high chromium stainless irons; these, when containing 16–18 per cent. chromium, possess very desirable corrosion-resistant properties, but unfortunately such irons are rather brittle. Brown Bayley's Steel Works, Ltd., have, however, produced a special form of this iron which is tough and ductile. It is very easily fabricated by boiler-makers' methods, and is an ideal material for riveted constructions.

Cannon Iron Foundries, Ltd.

[Stand No. A6.]

Cast iron chemical plant, lined with a special hard grey acid-resisting enamel, is exhibited by Cannon Iron Foundries, Ltd. The individual items shown include a steam-jacketed mixing pan, of 50 gallons capacity, with dome cover, agitator, totally enclosed gearing and gland outlet; a small scale recovery plant, comprising steam-jacketed mixing still (to tilt), coil condenser and recovery vessel, complete with fittings and connections, as used in the manufacture of synthetic resins; a British standard shallow steam-jacketed pan (50 gallons capacity); a British standard deep steam-jacketed pan (100 gallons capacity); a steam or oil jacketed mixing digester; "Clayton" mixing digesters, of ½ and 1 gallon capacities, complete with fittings; an improved square surface condenser, giving a large condensing surface; cast iron pipes, bends, and tees; lipped evaporating bowls and dishes; and furnace pans with a flat rim and also with a bell mouth, with and without outlets.

Cannon cast iron chemical plant is British throughout, and is backed by more than 100 years' manufacturing experience.

T. and C. Clark and Co., Ltd.

[Stand No. B11.]

Part of the exhibit at this Stand will consist of representative vessels in enamelled cast iron and will include an open type steam-jacketed tilting mixer, a steam-jacketed pan and still, and various small pieces suitable for laboratory or research work and small scale manufacture. A new departure is the application of Clark's acid and alkali resisting enamels to mild steel and they are showing for the first time specimens of articles coated with this enamel, which is guaranteed lead free. These include a storage vessel on adjustable feet, drying trays, bailers and small seamless vessels for carrying or storing corrosive liquids.

The Dorr Co., Ltd.

[Stand No. B21.]

Machines and processes for the continuous agitation, classification, thickening, washing and filtering of a great variety of mixtures of liquids and solids are the speciality of the Dorr Co., Ltd., and are here illustrated by models, photographs, and flowsheets.

Prominent amongst the exhibits is a 4 ft. × 1 ft. Dorrco filter. This is a drum rotary vacuum filter, the novelty of which is the use made of gravity to assist cake forming and cake discharge. Excellent results have been obtained when treating caustic mud (calcium carbonate) from causticising plants, and the gypsum (calcium sulphate) formed in the production of phosphoric acid from phosphate rock.

Those interested in china clay, whiting, milk of lime, and similar materials required in a grit-free condition, will be particularly interested in the model Dorr bowl classifier. The material to be treated is fed to the centre of the circular bowl, and the finished product overflows into its peripheral launder. The deposited grit is swept by radial arms carrying blades into the lower sloping rectangular compartment, to be raked to the upper end, washed there, and discharged in a cleaned condition with the minimum of moisture. Large capacity and high efficiency are obtainable with this machine.

Features of Dorrco diaphragm pumps are illustrated by a ½ inch pump of the suction type, and the well-known Dorr system of continuous counter-current decantation in the chemical industries is illustrated by two models. These show the Dorr agitators in which the reaction takes place, and the series of thickeners for the subsequent decantation of the liquid and washing of the solids. The fundamental soundness of this system, its simplicity, and its automatic functioning become obvious from an inspection of the models, one of which is in operation. Caustic soda, phosphoric acid, and lithopone are prepared in numerous large and important plants by the system, and barytes is bleached and cobalt oxide is washed by the same method.

Elliott Brothers (London), Ltd.

[Stand No. B26.]

On this stand a typical flush-mounted instrument and control panel for a boiler house shows how a pleasing appearance and uniformity of design may be obtained by electrical transmission of the boiler house measurements to indicators mounted together on the panel. The simplicity of design and boldness of scale, together with the combination of the necessary indicators in the one case, facilitates readings of different correlated quantities such as steam flow, pressure, draft, CO_2, temperature, smoke density, etc. The panel is of thin steel, with a black enamel finish, consistent with the latest modern practice, and is fitted with signal lamps and push-button control for distant operation of dampers, fan and stoker motors. An electrical indicator, suitable for a boiler house, with a smoke density scale, is also shown. Here a beam of light is projected across the flue and focussed on to a total radiation pyrometer to which the indicator is connected.

Among other exhibits is an ardometer for the measurement of high temperatures, particularly in cases where it is impracticable to use thermo-electric pyrometer stems. This instrument is a form of fixed focus total radiation pyrometer, characterised by having the element enclosed in a glass bulb filled with an inert gas. A simple moving coil indicator is connected to the ardometer, and once the apparatus has been set up, no further adjustment is necessary for the varying temperature readings to be obtained, using either an indicator or a recorder. A standard flue gas analysing apparatus comprising CO_2 and $CO+H_2$ outfit is shown on a metal frame for mounting on a boiler setting, to assist the stoker to maintain economic firing. The robust construction of this apparatus is of particular note, and the boldness of the indicator scales enables readings to be observed at a considerable distance. There is also a continuous chart recorder, which may be flush mounted, having a very sensitive measuring system, arranged for recording six independent readings on one chart. Here the motive power is a separate seven-day clock with contacts for operating off D.C. supply mains or batteries, and the contacts energise an electromagnet which switches on each of the six circuits in turn, changes the colour of the record and feeds the paper forward.

Various types of thermo-electric pyrometers and electrical distance thermometers together with appropriate indicators and recorders are also shown on this stand, including multi-point indicators, especially suitable for Diesel engine exhaust temperatures, and for cold stores and process tanks.

Thos. Firth and John Brown, Ltd.

[Stand Nos. B13 and 25.]

Here a very notable advance in the technology of Staybrite steel production is demonstrated by Staybrite F.D.P. steel. This steel, whilst retaining all the corrosion resisting qualities

associated with the nickel chromium series, has, by its elimination of any possibility of disintegration at the welds, removed the necessity for heat treatment of cumbersome items of plant during fabrication.

The stand in itself is interesting from the point of view of its demonstration of the uses of solid drawn tubing of considerable dimensions, together with pipe fittings, valves and details that can be carried out in Staybrite steel. Chemical engineers and plant manufacturers have devoted so much study to the application of corrosion resisting steels, that their interest cannot fail to be drawn towards the various exhibits, which include a wide range of plant made from Staybrite steel mainly applicable to chemical processes, but including several examples of interest to the food manufacturing and similar industries. So rapid has been the application of this family of Staybrite steels to the chemical engineering and general industrial fields, and so numerous have been the development of steels within the Staybrite family, that even the well informed will find a mass of technical information available upon request.

G.K.S. Combustion Co., Ltd.

[Stand No. A13.]

A nickel chromium cast-iron alloy (Hercia) having special and very distinct heat-resisting properties, is being shown on this stand. This material will successfully withstand varying or consistent temperatures up to 950° C. The tensile strength at normal temperatures is 17/20 tons per sq. in. Examples of furnace components and castings, chemical vessels and castings are being exhibited. In addition there is a ferro-silicon alloy (Arcia). This is much tougher than the usual materials of this nature and, owing to its resistance to the corrosive action of certain chemical media, has a wide range of usefulness in the fabrication of chemical plant.

A battery mixer, designed for mixing or diluting paints, enamels, inks, patent foods, pastes and similar materials, is also exhibited. This machine is of the " 4 unit " type, the capacity of each unit being 10 gallons. Each unit is driven from the main shaft by a single plate friction clutch and spiral gears, and can be worked independently. The pans are arranged at a convenient height from the ground to permit their being emptied without removal. Other exhibits include a model of the " Foster " quick-opening and self-sealing door, demonstrating its principles and advantages for large chemical vessels; a typical example of the " GKS " series of cast iron grinding mills; various small castings applicable to the chemical and allied industries made of ferrous materials; and " GKS " patent firebars which are claimed to give maximum windage per sq. ft. of grate area and complete combustion of any commercial class of solid fuel. These latter firebars are made of " Hercia " and are guaranteed to give 75 per cent. longer life than ordinary cast iron under equal conditions, and examples of new firebars and firebars after 12 months' service are exhibited.

A. Gallenkamp and Co., Ltd.

[Stand No. B33.]

At this stand there is being exhibited an interesting variety of laboratory apparatus and other apparatus, amongst which are electrically-heated ovens for drying or small manufacturing operations, which can be controlled, so that the temperature does not vary within one-tenth of a degree; also electric furnaces, which are automatically controlled, so that the temperature may be kept indefinitely within a degree or so. In the latter case the user on starting the furnace can leave it in safety, knowing that on reaching the desired temperature the current will be automatically reduced.

Stainless steel utensils for the laboratory, vacuum drying ovens, recovery stills, Soxhlet extractors, homogenisers, filter presses, shaking machines, mills and mixing machines, and many other adjuncts to the works laboratory are also exhibited. The " Meta-Filter " is a filter working on an entirely new principle. It is particularly successful where other filters fail, in rendering a perfectly clear filtrate where stubborn liquors are concerned. It has rendered good work in this connection with wines, beers, food extracts, agar-emulsions, varnishes, and in all cases where a rapid and complete filtration is required. Another interesting exhibit is that of utensils made from " Ironac," an acid-resisting metal particularly suitable for chemical plant work.

Wm. Gardner and Sons (Gloucester), Ltd.

[Stand No. B10.]

The combined patent " Rapid " sifting and mixing machines shown on this stand are designed for sifting and blending all kinds of dry powders. These machines consist of a regulating automatic feed for controlling the supply of ingredients, which pass from this to the sifter. The materials are then acted upon by a specially designed brush which causes the material which is fine enough to pass through the meshes of the sieve; any lumps are carried along to the grinding and reducing portion of the brush, which breaks up these lumps to powder and at the same time passes them through the sieve, while any foreign matter or irreducible lumps are automatically thrown over the outlet spout at the end of the machine. The sifted powder then falls into the mixing or blending chamber, which is of special construction and adapted for thoroughly blending any number of dry ingredients, which can thus be accurately mixed in a remarkably short time. The blended powders are quickly and automatically emptied into any desired receptacle by opening the discharge outlet at the bottom of the machine. The machine is designed for ease of cleaning, as all parts are interchangeable. It can be used for a variety of purposes.

Gardner's patent " Rapid " dryers, for rapidly removing moisture from powders are also shown. These dryers are a great improvement on the old fashioned drying rooms and stoves, and other cumbersome methods of drying in connection with powders. They are supplied for heating by steam, gas, or electricity, and are fitted with an internal agitator for keeping the materials in constant motion while in contact with the heated chamber. Gardner's patent " Rapid " combined sifter and mixer with patent sprayer, for adding liquids, essences, flavourings, or colours in liquid form to powders, consists of the firm's well-known combined sifting and mixing machine, which sifts and blends powders, but when liquid essences or flavourings are added, it is necessary that the complete charge when mixed should contain its accurate amount of liquid or moisture, and this machine enables this desideratum to be secured. Their latest improved type of patent sprayer is now fitted with an air pump and compressor, both the liquid and air control being under one operating tap. Another feature of the machine is that by means of the patent free-wheel clutch arrangement the sprayer can be thrown instantly out of action if desired, and the machine can then be used for sifting and mixing purposes only.

Another machine containing novel features is Gardners' quick-change powder dresser, which is specially adaptable to the chemical trades, as through the medium of this machine, powders can be sifted through very fine meshes. An improved feature of this machine is that the dressing cylinder is made in three sections, for ease of cleaning and changing. Spare dressing barrels can be supplied, of any mesh, and these can be very quickly changed when the machine is being used for a variety of purposes or colours. Various grades of powder can be produced on this machine at one time, and it is automatically dust-proof. An automatic feed is provided, so that the operator can regulate the supply of powder to the dressing machine.

Amongst other exhibits are roller grinding mills, vertical and horizontal stone grinding mills, and Gardners' new patent double agitator mixer, which is specially designed for keeping lumpy materials in a granular condition. Here the powders, molasses, liquids, etc., are mixed together and kept in a granular state by two sets of agitators, one working inside the other, in opposite directions; these double agitators have serrations of saw-shaped teeth fitting inside each other, which insure the ingredients being thoroughly mixed in a granular form. Another exhibit of interest is a patent flaking, shredding, and granulating machine, for waxes and similar materials. In this machine the blocks of wax are placed in the mouth-piece and by means of the automatic feed, are kept in contact with the revolving disc and cutters, and thereby reduced to thin, granulated flakes, to facilitate dissolving, melting, or other processes.

Grant and West, Ltd.

[Stand No. B.1.]

The chief exhibits of interest at this stand are "Selek," a jointing material in powder form, which in practice forms a non-oxidising, non-rusting joint, guaranteed to withstand any temperature or pressure of steam, water, brine, alcohol, petrol, oil, spirits or chemicals; "Belfo," a British-made belt food, which has been specially prepared by the manufacturers for the treatment of all forms of belting, including leather, hair, balata, cotton, composition or link; and "Plastiloy," a plastic metallic packing, having the unique advantage that it is a one size packing for all size rods and glands. Stainless steel castings and acid-resisting compounds are also being shown.

Gwynnes Pumps, Ltd.

[Stand No. B.15.]

The Gwynne-Doulton pump, as exhibited on this stand, has been put on the market to meet the demand for a pump dealing with acid liquors, and is so designed that the unit is protected by acid-resisting stoneware from the liquors handled. This unit, which is the product of two well-known firms, namely, Gwynnes Pumps, Ltd., and Doulton, Ltd., has proved eminently satisfactory in service, and many repeat orders have been secured. A small "Utility" "Invincible" pump, also shown, has found a ready market as a centrifugal pump for dealing with small quantities of liquid. Special attention is drawn to the construction and rigidity of this pump, which is so often lacking in similar designs, and the question of distortion by pipe connections has been carefully considered. The "K" type horizontal split-casing pump shown is a highly efficient unit, suitable for heads up to 150 ft.

Hadfields, Ltd.

[Stand No. A.7.]

Hadfields are showing "Era/C.R." non-corroding steels which are specially resistant to a wide range of corrosive media. With these are exhibited also a range of "Galahad" rustless steels. Research in this branch of metallurgy is continuously being carried on by Hadfields's extensive organisation, and the recent development of these special steels has been very rapid, new outlets being continually found for their use in industry. Examples of steam turbine blading in "Hecla/A.T.V." non-corroding steel are indicative of Hadfields's activities in this direction. The use of "Hecla/A.T V." steel for this purpose and for other parts subject to the corrosive and erosive action of steam is increasing rapidly, and this steel has already been incorporated in some two and a half million horse-power of turbines in both land and marine service. In the production of "Era/H.R.," "Era/A.T.V." and "Hecla/A.T.V." steels Hadfields, Ltd., are associated jointly with La Société Anonyme de Commentry-Fourchambault et Decazeville, and with the Midvale Co. of America.

Amongst other exhibits is a small stone-breaker of the jaw type. This particular machine is of the single toggle type and is made in several sizes. Hadfields, who are large manufacturers of crushing machines for all purposes, including jaw, gyratory, disc and roll crushers, recently supplied three large crushers of the jaw type, with a capacity of 200 tons of crushed stone per hour, for work in connection with the construction of the Cauvery-Metur Dam, Madras, which, when completed, will be the largest dam in the world. They are in a position to supply still larger crushers and provide the necessary auxiliary machinery for complete crushing plants of the largest dimensions. All parts of their machines requiring great strength are made in steel, and the renewable wearing parts such as jaws, rolls, discs and cones, and other components that are subjected to the abrasive action of the stone and ore, are made in their "Era" managanese steel.

Harrison Carter, J., Ltd.

[Stand No. B.2.]

The flat sifter, which is of particular interest at this stand, is a new machine, worked on the vibrating principle. There are types of vibrating sifters already on the market, but in most cases these machines vibrate the actual cover, which, of course, is of no use when a very fine mesh is required, as the cover could not stand up to it; but in Harrison Carter's machine the whole tray itself vibrates, and the angle of the tray can be adjusted whilst working.

The granite edge-runner mill, another noteworthy exhibit, is a standard machine re-designed. The novel feature of this mill, unlike other mills of this type, is that the whole of the weight is not on the bedstone but on the cast iron pan in which the bedstone rests, the advantage of this being that the bedstone, where the wear takes place, can be re-dressed until there is very little left. The hopper is made of stainless steel, as also is the centre hub, and this is a great advantage when dealing with certain materials.

Apart from these two machines the only other machine of new type is a 9-inch disintegrator, which can be used either for laboratory purposes or for large-scale work. This mill is mounted on legs, so that cost of erection is reduced to a minimum.

G. A. Harvey and Co., Ltd.

[Stand No. A.11.]

Of outstanding notice on this stand is an extensive range of perforated metals. G. A. Harvey and Co. have nearly sixty years' experience in perforating, and one is astonished at the many purposes for which perforated metal is required. A new catalogue (No. 464) contains 188 pages dealing with the subject of perforated metals. Woven wire cloth of all meshes and gauges is produced by this firm and is described in their catalogue No. 269.

In view of the progress that is being made in this country in the canning industry, the exhibit of a photograph of a new vertical processing retort on this stand is of interest. The specially constructed swing bolts and perforated baskets offer many advantages for easy, safe and rapid operation. G. A. Harvey and Co. manufacture all kinds of apparatus for use in food manufacture, including horizontal processing retorts, can and bottle crates, cooling tanks, sterilisers, jacketted pans, washers, vacuum drying and evaporating pans. Many kinds of industrial plant are also undertaken complete at their works, the more important appertaining to the chemical and allied trades, comprising steel plate work up to 1½ in. thick, and bulk oil storage tanks up to 116 ft. diameter. Enlarged photographs of many plants are displayed, including fractionating towers, distillation plant, vacuum dryers, patent crystallising plant, vacuum evaporating plant, impregnating plant, tar stills, etc.

Hathern Station Brick and Terra Cotta Co., Ltd.

[Stand No. B.19.]

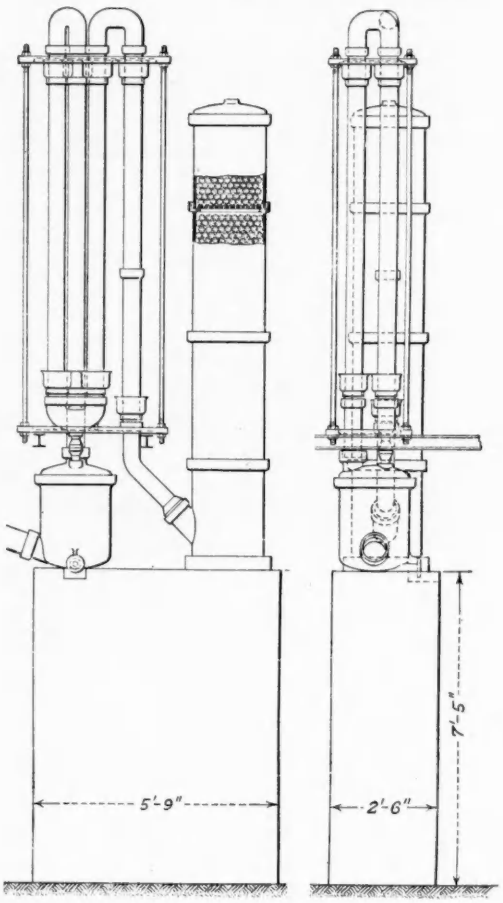
The Hathern Station Brick and Terra Cotta Co., Ltd., commenced to manufacture chemical stoneware early in 1915, when chemicals were required in large quantities for high explosives. On their stand they are exhibiting a range of stoneware for the storage and handling of corrosive liquids and gases. Prominent among the exhibits is a large enclosed acid receiver, of 150 gallons capacity. This receiver weighs half a ton, and is the largest one which could be brought into the Exhibition. The receiver was originally designed for storing sulphuric acid after concentration in a Glover tower. Another interesting exhibit is a 45 in. diameter nitrating pan, complete with stand and the necessary plates. Up to the present time, this company has made about 1,600 pans of this type. Among the small exhibits is a collection of stoneware taps and cocks, and plain open circular and rectangular tanks, one of which is finished inside with a high quality white glaze.

Haughton's Patent Metallic Packing Co., Ltd.

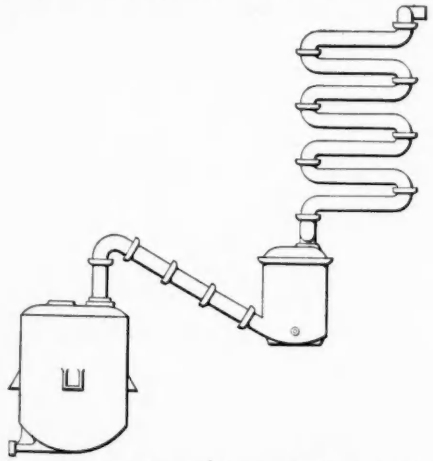
[Stand No. B.32.]

This exhibit comprises Tungay's improved water atomisers or spray nozzles for the intensive working of sulphuric acid chambers. These spray nozzles are of an entirely improved design combining a sponge filter, and a primary and secondary spiral for producing a mist-like spray. The actual nozzle outlet is of porcelain and all parts in contact with acid gases

are of acid resisting metal. The atomisers are sold complete with a lute or sealing arrangement ready for fixing to existing sulphuric acid chambers. These atomisers are being widely welcomed for the intensive production of sulphuric acid.



NITRIC ACID PLANT CONSTRUCTED IN IRONAC METAL. (HAUGHTON'S PATENT METALLIC PACKING CO., LTD.)



ACID CONDENSER CONSTRUCTED IN IRONAC METAL. (HAUGHTON'S PATENT METALLIC PACKING CO., LTD.)

Ironac acid-resisting iron is also exhibited on this stand together with specimens of this metal in various acids and acid solutions, specimens having been in contact with the acids since 1914, without any sign of deterioration or corrosion. This Ironac metal is now widely recognised as a form of ferro-silicon having quite exceptional corrosion resisting qualities when in contact with mineral acids. It is used very generally by manufacturers of nitric and sulphuric acids and by the various explosives works. Specimens of vessels made of Ironac metal are shown, together with pieces of pipe line and numerous castings of special parts.

Examples of pumps, valves, taps and elevators of various designs are shown, these being manufactured in regulus metal and in Ironac metal for use with sulphuric and nitric acids, including a new type of full-way sluice valve for acid constructed in Ironac metal, so as to be used either for nitric or sulphuric acid, and fitted with loose flanges for coupling up to pipe line having coned ends. Haughton's are well-known as one of the largest suppliers of equipment for acid plant, their productions being standardised in many Government Departments both at home and abroad

W. C. Holmes and Co., Ltd.

[STAND NO. B 31.]

THE "Wikner" tar dehydration plant, of which particulars are available at this stand, is an efficient means of procuring a dehydrated and pre-heated tar through the medium of high pressure steam only. Its efficiency will be readily appreciated by consideration of the average steam consumption of only 200 lb. of steam per ton of cold crude tar containing approximately 5 to 6 per cent. of water; with this steam consumption it can be dehydrated and preheated to about 140° C. The "Taylor" benzole process produces a high grade benzole which can be chemically washed and rectified without preliminary distillation, and, at the same time, enables automatic and thermostatic control of the crude benzole still. The wash oil can be completely stripped from naphthalene, which is recoverable as a fraction separate from either the crude benzole or the wash oil.

Amongst the exhibits is a motor-driven Connersville air blower, having a capacity of 124 cu. ft. per minute, against 3 lb. per square inch pressure. These machines are of the rotary figure-of-eight impeller type, and are made in all sizes up to 1,500,000 cu. ft. per hour, and for a maximum discharge pressure of 12 lb. per square inch. In this blower there are no parts in contact, the impellers being separated by fine clearances, hence the mechanical friction is confined solely to the bearings and gears.

Also shown on the stand is a Connersville gas or air meter constructed on similar lines to the blowers. This meter has a capacity of 65,000 cu. ft. of gas per hour, and is guaranteed to be accurate within 1 per cent. Attention is drawn to the small ground area occupied by this meter, namely, 2 ft. 6 in. × 6 ft. 6 in., the height being only 4 ft. 6 in. Other exhibits include "Holmes" double-faced Western valves, a section of a rotary brush washer, and models of tar extractors, gas washers and other chemical plant of W. C. Holmes and Co.'s exclusive design and manufacture.

Huntington, Heberlein and Co., Ltd.

[STAND NO. A 16.]

INCLUDED in the exhibit of Huntington, Heberlein and Co., Ltd., is their latest type all-steel jigging screen. The main feature of this screen is the extremely simple method of driving the machine, which is effected by means of the revolution of an unbalanced pulley. The grading efficiency of this screen is of the order of 95 per cent. The "H. H." vibrating screen is also demonstrated by means of a small model screen. This machine is driven by means of a special high-speed unbalanced pulley running at 1,750 r.p.m. Vibrating screens are coming into service in increasing numbers in a wide range of industries, and Huntington, Heberlein and Co. were one of the first two manufacturers of these screens in this country.

The "H. H." vertical dryer is made in a large number of sizes, and is used for the drying of materials such as sand, chemicals, coke, coal, salt, food products, pigments, sulphate of ammonia, etc. Two of the largest dryers have been supplied to the Dutch State Mines for the drying of ammonium sulphate.

Huntington, Heberlein and Co., Ltd., undertake special work for the chemical industry, such as the construction of special tanks, receivers or other plant in acid-resisting or

other special metals. Among the photographs shown is one of a special pure nickel tank, mounted on a Morris 30 cwt. chassis, which was constructed for a firm in the Far East. This was the first tank of its kind to be made in this country, and was used for the conveyance of rubber latex. All the fittings, valves, run-off pipe, etc., were of pure nickel.

The Hydronyl Syndicate, Ltd.

[Stand No. B18.]

Many operations most commonly employed in chemical and allied processes depend on bringing gases or vapours into close and intimate contact with liquids. The rapid development of processes involving the manipulation of large volumes of gas and the immense expansion of distillation processes, such as the preparation of motor spirit, have therefore shown the need for replacing old established methods as the treatment of gases in scrubbers charged with lumps of coke, or the distillation of oils in old-fashioned plant with repeated fractionation, by more up-to-date and rational means.

This problem of presenting a maximum of surface within a minimum of space has been solved by Dr. R. Lessing's invention of his well-known contact rings. These devices, consisting of small cylinders, having a central partition, are dropped indiscriminately into scrubbers, distilling columns, reaction or absorption towers, or similar types of vessels where they expose for any given size of unit maximum of surface within a minimum of volume. Thus the contact surface of 2 in. rings amounts to 35 sq. ft. per cu. ft., whilst it rises to 368 sq. ft. per cu. ft. in the case of ⅛ in. rings; the free gas space left varies from 96% to 85% within this range of sizes. The irregularity of the arrangement of the rings causes frequent deflection of gas or of vapour and liquid in their passage through the tower. Intimate contact is brought about by the frequent change of direction whereby new surfaces are continuously exposed and liquid drops and gas bubbles are broken up many times in their passage through the mass of rings. The small volume occupied by the ring material produces an almost negligible constriction of the vessel and back pressure is therefore reduced to a minimum. Moreover, the total cubic capacity of the vessel for any given duty is remarkably small when compared with the dimensions of ordinary scrubbers or distilling columns. The use of Lessing contact rings has therefore made it possible to obtain results in fractional distillation which before their introduction were considered unobtainable, and much cleaner "cuts" can be effected with their aid than with much more complicated plants. Even where no fractionation is attempted, forerunnings and residues can be kept out of the distillate with absolute certainty, thereby increasing the value of the product.

Lessing rings have enjoyed for many years wide application for the most varied purposes. In distillation they are used at all temperatures from that obtaining in the fractionation of liquid air into oxygen and nitrogen, up to the separation of carbolic acid and the cresols from a mixture of crude tar acid. They are used in one of the largest plants for the production of industrial alcohol, for the preparation of motor benzol and for the preparation of benzene, toluene, and xylene from the light distillate of tar oil, as well as for the preparation of many various hydrocarbons, esters, and essential oils. The application of these rings for scrubbing and gas washing purposes covers a very wide field in ordinary gas and coke oven works practice. Scrubbers for ammonia, benzol and naphthalene extraction based on these principles occupy only a fraction of the huge volume required for the customary scrubbers filled with coke or wooden laths. They are particularly applicable to the treatment of gas with drying agents and for the extraction of tar vapours from crude gas. These rings are an ideal medium for packing absorption towers, dust separators, vaporisers, for enriching coal gas or introducing naphthalene solvents, oil separators for steam plants, and for increasing the efficiency of condensers, coolers, heat exchangers, and humidifiers.

Rings of specially prepared materials are used for reaction vessels and catalyst chambers. The exhibit consists of large glass towers showing rings of various sizes and materials indiscriminately packed as in actual works operation, the size of ring varying from 2 inches down to ⅛ inch. A number of applications to laboratory practice are shown and their use in distilling operations is exemplified by a fractionating apparatus with a 6 ft. high ring-filled column for precision work. A working model of a scrubber made of glass demonstrates on a semi-technical scale the mode of action and the intimate contact effect obtained by passing a current of gas through the tower, whilst the ring surfaces are irrigated by the circulation of water.

Imperial Chemical Industries, Ltd.

[Stand No. B9.]

Examples of research apparatus and equipment are shown at this stand, including apparatus for the analysis of gases by fractionation; a cinematographic record of growing crystals; an automatically-controlled furnace for precision work; wire models illustrating separation of salts in solution; low heat capacity thermo-couples; apparatus for determining equilibrium composition of vapour over solutions of two or more components; sections of high pressure valves for small scale work; a cryostat for maintaining temperatures between 0°C and—160°C., to 0·01°C.; a simple thermo-regulator; an adiabatic calorimeter for determining specific heats and heats of solution; and a flowmeter for gases at high pressures.

Industrial Waste Eliminators, Ltd.

[Stand No. B24.]

One of the most important exhibits here is the "Iwel-Laabs" patent sanitary dry-rendering plant for the profitable, sanitary, simple, and safe production of edible and technical fats, animal and poultry feeding meals, fertilisers, etc. The original "Iwel" patent dry rendering plant is well known to all interested in the treatment of animal by-products such as fats, bones, carcasses, offal, blood, etc., and has for many years been used by those handling such materials. The "Iwel-Laabs" process, however, embodies distinct new features making it a considerable improvement, the most important being the method of breaking down the bones, heads, portions of carcass, etc., without the use of a crusher. The natural moisture in the raw materials themselves is used as a force for this means, being converted, by the heat from the steam jacket of the melter, into steam. Contrary to the old practice, in which this steam was drawn off as fast as created, it is now retained in the inner cylinder, together with the materials themselves, until a suitable pressure has been set up. This pressure combined with the action of the agitating gear, completely disintegrates the whole fibre of the materials, ensuring thorough release of the fats and perfect cooking and sterilisation. The process is therefore one which ensures the recovery of 100 per cent. of products having any commercial value. Nothing having been removed from the raw materials except unwanted moisture, the resultant products contain full protein and all other values, and are in great demand as concentrated animal and poultry foodstuffs. Fats produced, owing to other important features of the plant, are also of the best quality possible, analysing low in free fatty acid.

International Electrolytic Plant Co.

[Stand No. A4.]

The International Electrolytic Plant Co. are exhibiting Knowles cells for the production of electrolytic hydrogen and oxygen, with a guaranteed purity of hydrogen 99·5 per cent., and oxygen 99 per cent. direct from the cells. An actual cell is shown, which will run at a current of 1,000 amperes, 2·125 volts, producing 16·1 cubic feet of hydrogen and 8·05 cubic feet of oxygen per hour, with an electrical consumption of 132 kw. per 1,000 cubic feet of hydrogen. The Knowles patent temperature control is fitted to the cell, which enables the temperature of the electrolyte to be maintained constant at all loads. This ensures maximum possible efficiency from the cell under all conditions of load. This cell is typical of a large number of different sizes which are made by this company, to carry up to 10,000 amperes, or higher currents when required. The component parts of all cells are identical and larger capacities are obtained by increasing the number of electrodes per cell.

A model of a larger cell, sectioned to show the internal construction, is exhibited together with a set of automatic

water-feed and gas-washing tanks. The automatic feed tank maintains a constant level for the electrolyte in the cells, irrespective of the load on them, whilst the washer tanks wash out any electrolyte spray carried forward with the gases and return it with the cells with the feed water, so that the loss of electrolyte is negligible. The washers will deal with

TYPICAL BATTERY OF 100 KNOWLES CELLS AT CHEMICAL WORKS.
(INTERNATIONAL ELECTROLYTIC PLANT CO.)

2,000 cubic feet of hydrogen per hour, and a single adjustment fixes the electrolyte level throughout all the cells coupled to the same feed tank. A special feature ensures absolutely equal pressure on both sides of the diaphragms. By means of this apparatus attendance charges are reduced to a minimum, and one attendant can very easily superintend the running of a large battery of cells.

A number of enlarged photographs show Knowles plants running in various parts of the world. The uses for hydrogen and oxygen are rapidly increasing, and among the industries for which the company has supplied plants are synthetic ammonia for artificial fertilisers, oil-hardening, hydrogenation of coal tar products, electric lamp manufacture, lead burning, manufacture of synthetic stones, welding and steel cutting. In countries where cheap water power is available, Knowles cells are the ideal method of producing hydrogen for the manufacture of synthetic ammonia for artificial fertilisers. This company is just completing a large contract which comprises a battery of 306 cells operating at 10,000 amperes for the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, British Columbia, to produce hydrogen for this purpose. Other plants supplied for the same purpose are at present operating in Italy and France, whilst plants producing hydrogen for oil-hardening are working in this country, U.S.A., Canada South America, India, South Africa, Australia and New Zealand.

Johnson' Matthey and Co., Ltd.

[STAND NO. B20.]

PRECIOUS metals in the many forms in which they are prepared for use in the chemical industry are to be seen on this stand. One portion of the exhibit is devoted to silver plant in the form of condensers, stills, taps, cocks, etc., together with silver-lined copper tubing in various diameters and lengths. In order to demonstrate the application of silver lining to copper vessels one large copper pan is lined with this metal. Silver and silver-lined plant is now being extensively used in the vinegar, jam and acetic acid trades, owing to its comparatively cheap cost and its ability to withstand the corrosive action of the organic acids. Platinum is also shown in the form of gauze for catalytic purposes, in its chemical form as chloride, and as manufactured ware.

In addition there is an exhibit of Firth's Staybrite in the form of wire in fine sizes, made up in gauze form, the drawing of this metal in fine sizes down to 0·0005 in. diameter being a leading speciality of this company.

Kestner Evaporator and Engineering Co., Ltd.

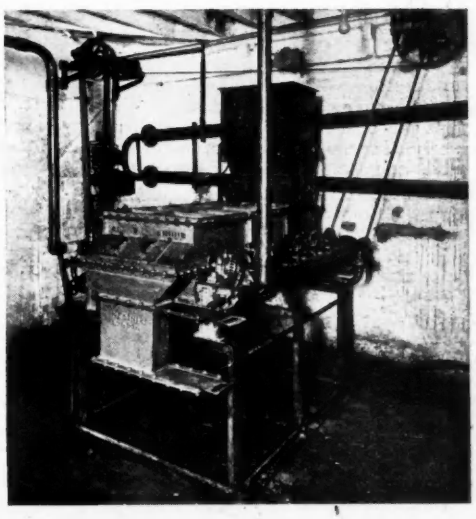
[STAND NO. B17.]

OWING to the small available space, the Kestner Evaporator and Engineering Co., Ltd., are not able to exhibit such typical plants as they would have wished, but they have a number of large photographs of actual installations of the chemical plant in which they specialise, comprising their well-known patent plant, such as film evaporators, film dryers, spray dryers, hot oil circulating system, heat exchangers, etc.

Exhibited on the stand is the Kestner E.M.S. (patented) dryer. This is an entirely new development, and is a dryer which may be used for problems in which the spray or film dryer is hardly applicable, for example, in the removal of water from semi-dry granular products, filter press cakes, etc. This plant can be heated by means of steam, hot oil circulation, waste flue gases, etc., and can be worked either continuously or on the batch principle; it is built in sectional form, so that it is a relatively simple matter to increase the output of any existing plant by adding further sections.

The Kestner submerged flame evaporator (Brunler patents) is also a recent development of an evaporator in which direct combustion of the fuel takes place actually in the liquor that is being concentrated; consequently very high efficiencies can be obtained, as, apart from radiation losses, the whole of the heat of the fuel is usefully employed. The vapour leaving the evaporator may, if required, be used for driving feed pumps or other similar purposes. This plant has the great advantage that the heat is not transmitted to the liquor through a metallic surface, and consequently the difficulties of hard scale formation from scaling liquors are practically eliminated.

The Kestner silica gel air dryer is a new type of plant employing silica gel for air drying purposes. The plant exhibited will deal with some 1,000 cubic feet of air per minute, and remove over 90 per cent. of the water from the air. After drying about a quarter of a million cubic feet, this size of unit requires regenerating to drive out the adsorbed moisture before it is ready for a fresh drying cycle. The regeneration may be carried out by heating the plant in any convenient method, and the unit exhibited is arranged for



THE KESTNER E.M.S. DRYER.
(KESTNER EVAPORATOR AND ENGINEERING CO., LTD.)

electric heating. Unfortunately, owing to the regulations of the Exhibition building, it is not possible to demonstrate the regeneration, but the air drying cycle will be shown working to those who are interested. This type of plant is not only of value in producing air of almost zero water content, but also for the purification and drying of compressed gases, such as oxygen, carbon dioxide, etc.

Of the Kestner vortex stirrer, a small working model is shown, from which can be seen the very extensive mixing and stirring effects obtained. This stirrer not only has the advantage of efficient mixing in a short time, but also if required, can be arranged with a special flexible bearing, so that no foot-step or other bearings inside the liquor are necessary. The Kestner high speed stirrer, seen working in a rubber-lined vessel, is of value in cases where it is not required to obtain such an intensive mixing as would be obtained with

KESTNER HIGH-SPEED PORTABLE STIRRER.)
(KESTNER EVAPORATOR AND ENGINEERING CO., LTD.)

the vortex stirrer. One of its great advantages is that it is portable, and can be fixed to any existing vessel or tank and may be considered as a necessity in any works for all general mixing problems.

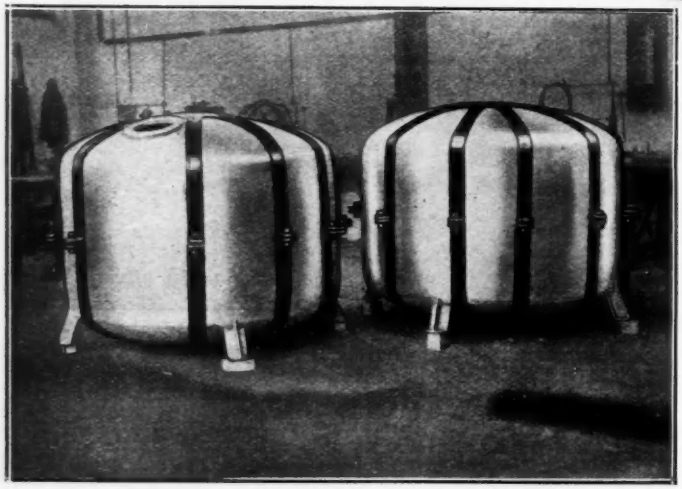
The Kestner pyrolene high temperature heating plant is an entirely new plant developed for obtaining temperatures of some 700° F.; these are higher than can be obtained by their patent oil circulating heating plant. This exhibit is shown operating with an automatically controlled temperature regulator. Among the remaining items is a Kestner patent acid evaporator as used for elevating sulphuric and other acids in cases where compressed air is available and the installation of a glandless acid pump is not suitable.

The London Aluminium Co., Ltd.

[STAND NO. B34.]

BECAUSE of its relative immunity from corrosion and its resistance to many chemical agents, aluminium takes an important place in connection with chemical plant. This is particularly true in the production of fatty acids, organic compounds and foodstuffs, and a variety of aluminium apparatus for these industries is therefore shown on the stand occupied by the London Aluminium Co., Ltd. This company has been fabricating plant and utensils for the chemical industry for more than thirty years. They operate an extensive plant specialising in aluminium and light alloys, comprising pressing, spinning, stamping, with sheet metal departments in addition to a special experimental division and a laboratory devoted to the production of resistant and decorative coatings on the metal. A considerable part of their production is in Londal alloy: this is somewhat harder and considerably stiffer than pure aluminium, and is little if any less resistant to corrosion.

Among the exhibits is a vertical closed storage tank of 350 gallon capacity having all seams welded. Such tanks are used in many branches of the industry. Trays for evaporating citric acid are also shown. A number of industries employ tubular coils for heating, cooling or condensation. These are very effectively made in aluminium and can be produced virtually in the form of a continuous tube from end to end whatever the form or size employed. Similar tubes and other forms are employed in the rubber trade where the resistance of aluminium to sulphur is important. Hoods for the concentration and exhaust of fumes are in extensive use, are easily erected and require no painting. Aluminium tiles of a patent interlocking type are being applied to buildings used for chemical processes and equally resist the effect of the fumes inside and the weather outside the building. These tiles are ingeniously designed and are very easy to lay.

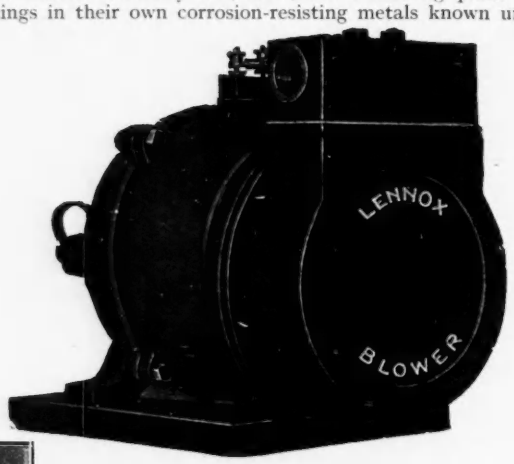


ALUMINIUM PRESSURE VESSELS WELDED AND REINFORCED.
(LONDON ALUMINIUM CO., LTD.)

Lennox Foundry Co., Ltd.

[STAND NO. B4.]

THE Lennox Foundry Co., Ltd., are exhibiting plant and fittings in their own corrosion-resisting metals known under



THE "LENNOX" MOTOR-DRIVEN BLOWER.
(LENNOX FOUNDRY CO. LTD.)

the trade names of Tantiron, Tantcopper, Tantlead' etc., including centrifugal pumps, rotary vacuum and pressure pumps, blowers, cocks, valves, pipes, pipe fittings, pans, and cascade basins. This company was the first to develop the use of high silicon iron on a commercial scale and research work has been carried on continuously in the laboratories at New Cross with the object of improving the quality of the metal and producing new alloys to suit varied requirements of the chemical industry.

Their whole range of centrifugal pumps has recently been re-designed in order to make possible the construction of pumps in the highest quality corrosion-resisting metal combined with high efficiency, and they are exhibited for the first time. Difficulties in the machining, drilling, tapping, etc., of high silicon irons have generally led to some compromise being made, involving the sacrifice of corrosion-resisting properties in favour of machinability and strength.

In designing these pumps the object has been to obtain the greatest possible simplicity, a minimum number of wearing parts, the elimination of bolt holes, studs, flanges, etc., thus permitting the use of only the highest quality metal throughout. Methods adopted for jointing pipes, fittings and pump branches have also been given special consideration, for flanges and bolt holes are a continual source of trouble both in casting the job, and, owing to breakages, when in use. The Lennox Foundry Co. therefore recommend that wherever possible all joints should be made by swelling the ends of the pipes and bolting firmly together by means of split cast iron back rings.

The vacuum and pressure pumps exhibited are of the rotary type, smooth silent running, and capable of maintaining vacuums to within one-fifth of a millimetre of mercury, or as a compressor giving a pressure of 50 lb. per sq. inch. They are made either belt-driven or direct-coupled to a suitable motor. A range of small blowers is also shown, with capacities from 2 to 50 cubic feet per minute and giving a pressure up to 5 lb. per sq. inch. These blowers are being used for such purposes as the running of blow pipes, circulating gases, filtering, agitating liquids, providing air for elutriators, etc.

Robert Jenkins and Co., Ltd.

[Stand No. B14.]

This firm is showing a range of spiral-gilled steel tubes of varying dimensions. There is also a vertical steam calorifier, 9 in. diameter, × 5 ft. 9 in. overall height, with the shell constructed from mild steel plate 5-16th in. thick, floating header in mild steel and steam box in cast iron. This calorifier which is tested to 100 lb. per square inch hydraulic is capable of 250,000 B.T.U.'s per hour, with flow 180° F. and return 140° F., or 200 gallons per hour with flow at 180° F. and return 50° F. when supplied with 280 lb. of steam at 25 lb. per square inch. Among other exhibits is a welded steel cylindrical tank for oil fountain, approximate capacity 58 gallons, tested to 50 lb. per square inch hydraulic and a 50 gallon storage tank, constructed from Firth's "Staybrite" F.D.P. steel, tested to 30 lb. per square inch and suitable for 15 lb. working pressure.

S. H. Johnson and Co., Ltd.

[Stand No. B6.]

The firm of S. H. Johnson and Co., Ltd., are exhibiting a 6 in. square jacketed filter press and a 9 in. square filter, single-standard, close-delivery, plate and frame type. There is also an air pressure filter with a pump and a laboratory hydraulic press for expressing oil from oil seeds and extraction of tinctures. An example of a 13-in. square filter press, flush-plate and distance-frame type, with washing arrangements is another exhibit, together with a 6 × 4 in. slide-valve vacuum pump, belt-driven and a 4 in. stroke "Simplex" steam pump. Included on this stand is also a Vortex mixer, a patent hand hydraulic closing-gear for a 32 in. square high-pressure filter, a jacketed filter plate with distance frame, a recessed type filter plate, filter cloths and filter paper.

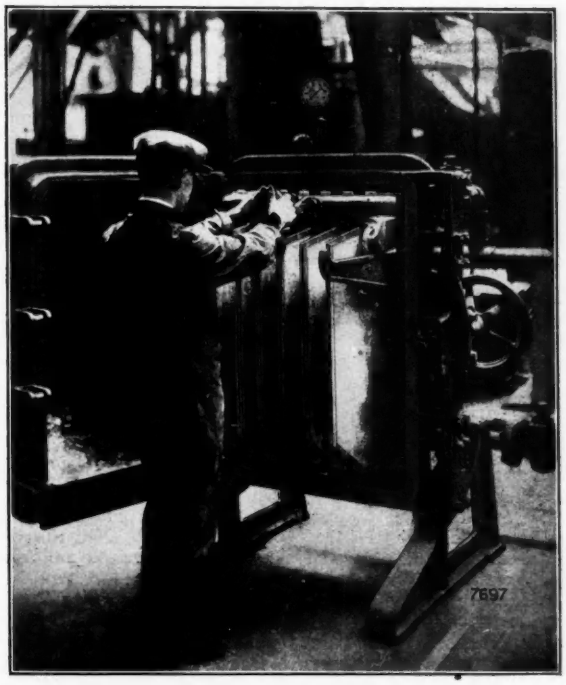
Manlove, Alliott and Co., Ltd.

[Stand No. B29.]

One of the principal attractions at this Stand is the "Easifilt" leaf filter, an entirely new patent filter, exhibited for the first time. It was originally designed for clarifying dry cleaner's solvent, since no British filter press was made which was entirely suitable. This filter can be opened, cleaned out and closed in approximately half the time previously taken on other types of leaf filters purchased from abroad. The rates of flow are extremely high, reaching approximately 65 gallons per square foot per hour over runs of many hours' duration at pressures rising from almost zero to between 30 and 40 lb. per square inch as the unit filled. The leaves are of the vertical type, and the filter is so arranged that when it is opened the whole height of the leaves is in view; this facilitates discharging, cleaning and inspection.

The "Easifilt" filter has many features which make it a valuable apparatus for many filtration problems, particularly for filtration of solvent and for the clarification of liquids generally. One form is specially adapted to handle cake which cannot be blown off the leaves by air pressure, such as cake which sticks too closely or cracks and allows the pressure to escape before it becomes effective. For such a duty, a floating leaf battery type of filter is employed. This design is such that the battery may be drawn clear of the filter on rails, thus permitting the cake to be dumped directly into a cake truck, rendering every part of the filter leaves easily accessible to the operator. The leaves can be clothed with cloth bags, or Monel or other metal wire screens. As a plant unit it is extremely compact, and lends itself to washing, steaming or air drying of the cake.

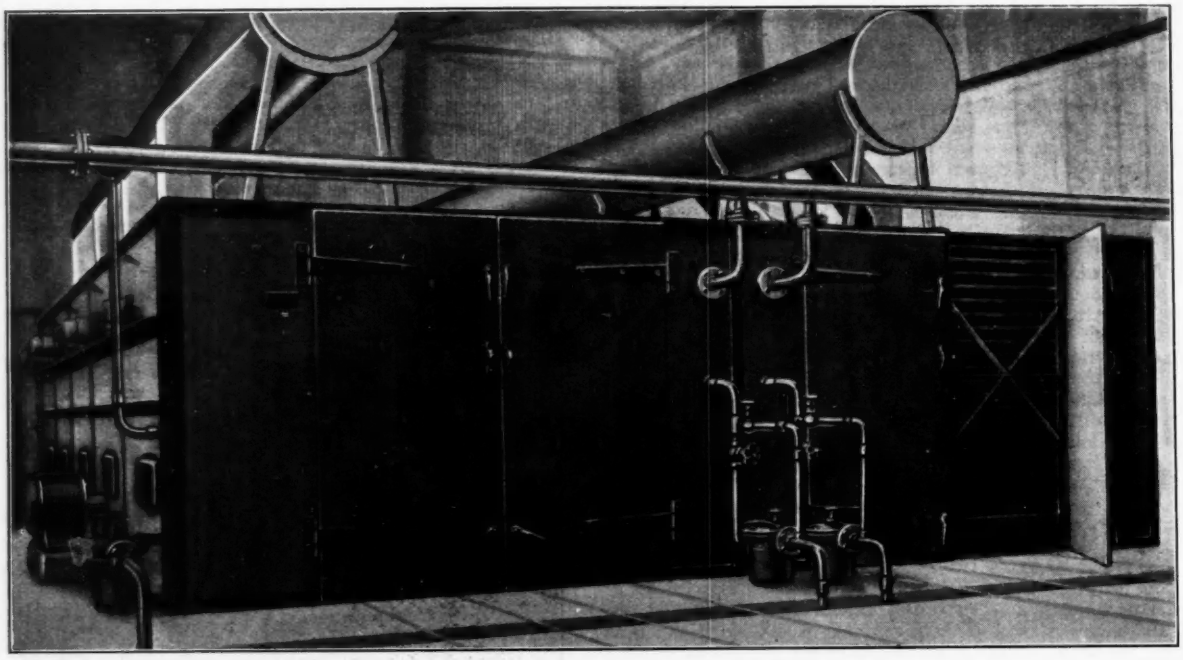
A neat and unusual laboratory leaf filter is also being shown. Here the leaf is attached to the hinged filter door, and is



Patent "Easifilt" Leaf Filter.
(Manlove, Alliott and Co., Ltd.)

arranged in the form of a quadrant to allow it to discharge easily. A hand pump is attached to the filter, and means are provided for circulating liquid continually from the feed pipe and passages to prevent their silting when filtering rates are low. Among other exhibits are cast iron filter plates for plate and frame presses. These are of the thorough washing type, with outside lugs so that holes do not have to be cut through the cloths. The arrangement of passages provides for flow of the wash liquid behind the cloth on one plate, through the cake and into the cloth on the next plate, leaving at the top so as to eliminate air. An air release passage is provided for the wash water on the feed side.

On this stand there is also a centrifugal mixing impellor which provides an ample stirring and agitating action at a comparatively low speed, and which may be suspended on a shaft having bearings only at its upper end, thus keeping the bearings free from contact with the liquor when corrosive substances are being handled; a 42 inch bottom discharge Weston centrifugal with countergear drive and its own self-contained working platform; a small rotary driver, 3 feet diameter, which could not be shown full length, owing to the space available, but which is shown in motion to illustrate the agitation given to the material handled; and a 24 inch diameter jacketed pan dryer, with internal agitators, suitable for drying batches of many products, including oxides, hypo-sulphites of soda, blood and other materials.



A Recent Installation of the Mitchell Drying Stove. (L. A. Mitchell, Ltd.)

L. A. Mitchell, Ltd.

[Stand No. B28.]

New features embodied in Mitchell drying plant are to be seen at this Stand. These drying plants are suitable for either large or small outputs, and installations are in operation which have a drying capacity of 30 tons per day, and evaporate up to 22½ tons (50,000 lb.) of water per day, from the wet material. The latest designs ensure the most rapid, uniform and economic drying; they can be operated at any temperature from room temperature upwards. Such dryers are built on the unit system, and are so designed that they can be easily extended to meet increased demands. On the other hand, these dryers can be operated on half output without loss of efficiency, or increased fuel consumption per lb. of dried material. The initial cost of the dryer is very low in comparison with the output, and colours, dyestuffs, etc., can be dried in a much shorter time than that taken by other types of dry rooms. Originally designed for the drying of colours and dyestuffs, they are now being employed for a wide range of products throughout the chemical, colour, dyestuffs and foodstuffs industries.

The Mond Nickel Co., Ltd.

[Stand No. B27.]

At this Stand the Mond Nickel Co. will display exhibits depicting the uses of nickel and its alloys in chemical plant. These will consist of samples of the semi-manufactured forms in which nickel, Monel metal and nickel-chromium stainless steel are available, together with typical items of plant, illustrated by photographs. A noteworthy exhibit will be a Monel metal centrifugal basket of the type used for drying sulphate of ammonia. In practice this basket is revolved at high speed and consequently must resist mechanical stress and erosion as well as corrosive attack by the products handled. Monel metal has been found to give ten times the life of the copper and bronze baskets formerly used for this type of work. Other important applications include pump rods, valves and cocks, wedge-wire screens for coal washing, etc. In recent years nickel-chromium stainless steel has become increasingly popular for the construction of certain types of chemical plant, particularly where resistance to attack by nitric acid is necessary, and exhibits in this material will be included on the stand.

Negretti and Zambra

[Stand No. A14.]

The chief exhibits at this stand are mercury-in-steel distance thermometers (indicating and recording). With these instruments the bulb is placed in the source of heat and is connected to the Bourdon tube in the indicator or recorder by means of a small bore capillary tubing. The whole system is completely full of mercury, and expansion of the mercury in the bulb, due to a rise of temperature, causes the Bourdon tube to uncoil, the amount of which is indicated by a pointer moving over a dial, or a pen on a chart. The two special features of the Negretti and Zambra patented mercury-in-steel distance thermometer are the direct action movement, and the compensated capillary tubing. The object of the direct action movement is to eliminate all gears, levers and hair springs, which cause friction and consequently inaccuracy. They are also a source of weakness as regards reliability, and causes of breakdown. In the Negretti and Zambra instruments, the pointer spindle, in the case of the indicator, is attached direct to the Bourdon tube, so that all the levers, etc., are avoided. The object of the compensated capillary tubing is that uncompensated capillary tubing, when heated, acts like a thermometer, owing to the liquid inside it expanding, and therefore, any variation in the air temperature causes an error in the reading of the instrument. This error, with long lengths of ordinary tubing, is very marked, but in the Negretti and Zambra instrument it is entirely eliminated. The capillary tubing may be of any length up to 150 feet, enabling the recorder or indicator to be placed in the most convenient position. The bulbs may be protected in pockets made of Staybrite steel, Monel metal, lead, silver, brass, etc., to suit requirements.

Hitherto, the range of temperatures of these mercury-in-steel thermometers have been 1,000° F., but this firm has now produced a high-range type of thermometer, made of special heat-resisting steel, reading up to 1,200° F. It must be realised, however, that the bulb is required to stand a very considerable static stress at high temperatures, due to the internal pressure of mercury, and it is of the greatest importance that there shall be no change in the structure of the bulb even though it is subjected to a dull red heat for some considerable time. The effect of the smallest permanent change in the bulb would be immediately apparent by a change of calibration, and when it is realised that the volume of

mercury thrown over by the bulb, when heated, represents only a small bead of mercury, the smallest change in the volume of the bulb would be at once noticed in the reading. The question of suitable material for the bulbs is, therefore, not only a question of the tensile strength at a dull red heat, but also its creep stress and the permanency of structure at that temperature.

The recording absolute pressure gauge also exhibited on this stand has been produced to give an accurate record of absolute pressure on an open reading chart, irrespective of any changes or fluctuations in atmospheric barometer reading. The movement consists of a set of diaphragms exhausted and sealed off under a vacuum. These diaphragms are mounted in an air-tight drum. The connection from the vacuum pipe leads to the drum. The diaphragms contained in the drum are influenced solely by the pressure of the air in the drum, and are completely insulated from the external atmosphere. With the connecting pipe open to atmosphere, the diaphragms are collapsed on themselves and remain so until the vacuum applied to the drum is sufficient to distend them. Diaphragms are used in place of a Bourdon tube on account of the greater control available for operating the pen arm and in order to give a more open scale of pressure. The movement of the diaphragms is transmitted to the exterior of the chamber and to the recording mechanism through a flexible metallic disc, thus avoiding the possibility of the air leaks and excessive friction frequently found with gland fittings. The complete movement is mounted in a cast-iron moisture-proof case, suitable for wall attachment.

Other exhibits include temperature control apparatus, suitable for thermocouple or resistance installations, where direct operation of signal lights, relays and small motors is obtained by means of three mercury switches incorporated in the instrument, and actuated by a motor-driven mechanism.

George Scott and Son (London), Ltd.

[Stand No. A15.]

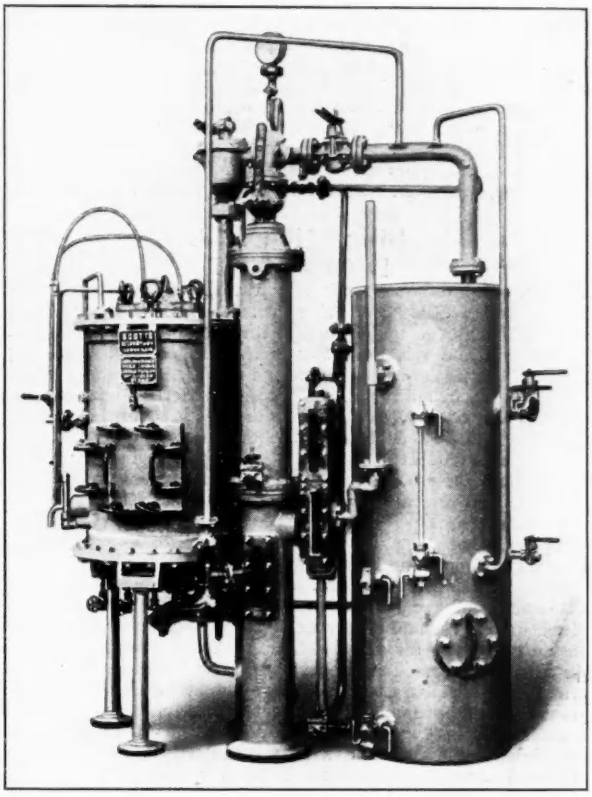
The firm of George Scott and Son (London), Ltd., have been chemical process engineers since 1834. They are manufacturers of general chemical plant, specialising particularly in evaporators and vacuum pans; dryers; solvent extraction plant; soap and glycerine plant; animal and fish by-products plant; plant for the production of caustic soda and chlorine electrolytically; plant for the recovery of soda in pulp and mercerising processes; plant for the utilisation of milk and milk by-products, etc.

Among the new chemical plant which has not previously been exhibited, is a patent forced-circulation type vacuum evaporator with external calandria. This design embodies the features of the ideal milk evaporator; there is accessibility to every contact part for cleansing and sterilisation and high velocity through the tubes of the external calandria as compared with which the conditions in a coil pan may be described as relatively stagnant. It also embodies facilities for rapidly cooling the product under vacuum while vigorous circulation is maintained, and is particularly adapted to the concentration of liquids from which high density products are required. Densities may be attained little short of solidification, which are obviously impossible in an evaporator dependent entirely upon natural circulation.

The Scott solvent extraction plant which is exhibited is the patent S.B. plant for the use of trichlorethylene. This plant is in line with the patent S.C.K. design. The former has been particularly designed for dealing with wet materials without agitation, while the latter is adapted to the treatment of materials of low moisture content. It is of the most elastic type and applicable to a wide range of materials.

Of Scott vacuum dryers, a model of a small scale unit on the most compact lines is shown. The location of the condenser with perfect drainage into the receiver; facilities for the observation of drying progress; the mounting of the vacuum pump; and the simplicity of the design render this plant unique.

The model of the Wagner patent stationary soda and sulplate furnace is exhibited for the first time in this country. It is primarily employed for the incineration of concentrated soda liquors from the pulp process. In one operation the combustion of all volatiles and fixed carbon is effected with the production of water-white soda liquor. This is combined with the production of steam from the hot gases in unprecedented volume. Greatly reduced chemical loss and the reduction of operation charges to a truly remarkable degree are achieved. Scotts' build complete soda recovery installations comprising evaporation, causticisation, incineration and lime filtration for the pulp trade, and collecting equipment coupled with the necessary recovery plant already described for the mercerising trade. They also specialise in plant (Wheeler patents) for the electrolytic production of solid caustic soda and liquid chlorine, with all necessary accessories.



Patent S.B. Solvent Extraction Plant
(George Scott & Son (London) Ltd.)

Another item of noteworthy interest is the patent S.E.S. automatic condensate pump which combines the perfect drainage of condensate at any pressure and the delivery of the condensate to any point without loss of steam. This unique pump, which is really steam-trap and pump combined, is a Swedish invention, and is exhibited for the first time in this country.

Siebe, Gorman and Co., Ltd.

[Stand No. B7.]

Siebe, Gorman and Co., Ltd., established in 1819, are the original inventors of respiratory appliances of every description. The "Proto" and "Salvus" types of self-contained oxygen breathing apparatus, on the regenerative system, making the wearer absolutely independent of the outer atmosphere, have been adopted by all the principal collieries, rescue stations, fire brigades, gas works, oil companies, and other concerns at home and abroad. "Spirelmo" smoke helmets, of all patterns to meet official requirements, are used on the principal steamship lines, and on oil tankers, and in oil depots, docks, gasworks, mines, etc. These helmets can be worn in any irrespirable atmosphere. The "Puretha" respirator is supplied for protection against almost any gas, different canisters being provided with special absorbents

to combat various fumes, and are very largely used for protection against ammonia, petrol, benzol, prussic acid, carbon dioxide, CO_2 and other harmful gases.

Another speciality of this firm is the "Novita" oxygen resuscitating apparatus which has been extensively adopted by large factories, fire brigades and oil concerns. A new type of resuscitating apparatus recently introduced is the "Novox," in which a mixture of oxygen and carbon dioxide (in the correct proportions) is used. This greatly aids respiration and accelerates recovery from asphyxiation by gassing. Many types of respirators are also supplied for protection against paint fumes (in paint spraying) and industrial dust. Among other exhibits are asbestos, acid-proof and waterproof clothing; safety gloves (rubber, leather, etc.); safety goggles, first-aid outfits, and a comprehensive range of fire extinguishers of all types and sizes, including their "Cardiex" foam type, "Flamex" soda acid, and "Tetclo," machines.

Silica Gel, Ltd.

[Stand No. B22.]

This exhibit is devoted to air dehydration and solvent recovery by the use of Silica Gel. The mechanical process by which silica gel removes moisture and impurities from gases is a simple one and relatively low in installation and operating cost. The gases are passed through silica gel adsorbers which contain beds of silica gel, and the gel adsorbs moisture, impurities and odours. When the silica gel is saturated, a flow of hot air is passed through the adsorber which drives off the moisture and impurities, reactivating the gel so that it is again ready for use. In practice these adsorbers are built in series so that one unit is adsorbing while another is being reactivated, thus providing for continuous operation. Such equipment has been designed and standardised for treating gases at both low and high pressure.

Dial hygrometers indicate the relative humidity of the atmosphere of the exhibition building at the intake to the plant, and a second instrument at its outlet registers the humidity of the air after dehydration by passage through the silica gel unit. This model plant is built on the "Turret" principle, that is to say, a series of compartments containing granular silica gel resting on mesh screens is arranged in a casing capable of being revolved at stated intervals of time in such manner that, while the majority of the openings of these compartments form intakes for atmospheric air, a certain number are in sealed contact with an air heater. The air heater consists of electric elements over which is passed, by means of a blower fan, atmospheric air which is heated up to a high temperature and passed through those compartments of the turret momentarily in communication with its outlet; the hot air in passing through the gel drives off the moisture that has been taken up during the adsorption period. A further number of these compartments are heated by means of an adjustable shutter precluding any air passing through them. The object of sealing off these compartments is to allow the gel to cool off before being added to those compartments which are adsorbing moisture from the atmosphere. These three processes of adsorption, activation and cooling can be demonstrated at any time by revolving the turret, thus affording the observer an opportunity of being able to handle the gel exposed for adsorption before activation and again after the cooling process.

The usual type of silica gel installation for general solvent recovery consists of two adsorbers and auxiliary equipment. The solvent-laden air is first cooled in a pre-cooler, and thence is conducted to one of the adsorbers. In this adsorber the solvent-air mixture is stripped of the solvent, together with any moisture which may be present. This removal of moisture as well as the extraction of solvent is an important factor, since many of the materials requiring solvents in their manufacture are highly sensitive to variations in the moisture content of the air. While one adsorber is recovering solvent from the solvent-air mixture, the other adsorber, now saturated with solvent and moisture, is regenerated. The adsorbed solvents are displaced from the gel pores by passing steam at atmospheric pressure through the adsorber. The steam and released solvents are then conducted to a condenser, where they are converted from vapours to liquids. If the solvent is miscible in water, the mixture is delivered to a rectifying column and the solvent is there separated. If the solvent is not miscible in water, it is decanted and recovered in an uncontaminated condition. After the solvent is released any residual steam is then driven off by passing heated air or products of combustion through the gel beds, and at the completion of this operation the adsorber is again ready to be introduced into the adsorption cycle.

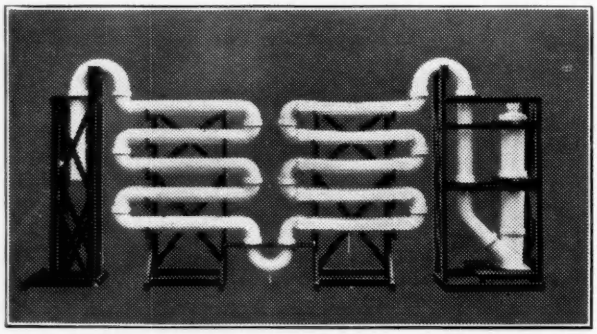
Included on the stand is platinized silica gel contact masses, which are now producing 10,000 tons of sulphuric acid monthly by the catalytic process in the U.K., U.S.A. and Belgium.

The Thermal Syndicate, Ltd.

[Stand No. A10.]

The exhibit shown by the Thermal Syndicate, Ltd., is a striking illustration of the advances made in the production of fused silica, which is sold by them under the trade name of "Vitreosil."

The size of the containers which are now available is illustrated in an impressive manner by the entrance to the stand, which consists of two receivers of 108 gallons capacity, surmounted by an archway of pipes of larger diameter. These



Synthetic Hydrochloric Acid Plant Constructed in Vitreosil.

(Thermal Syndicate, Ltd.)

receivers have a diameter of about 2 ft. 6 in. The back part of the stand is occupied by a complete synthetic hydrochloric acid plant, consisting of burner chamber, cooling system and adsorption towers. Other features of interest are a valveless plunger pump, in which the liquid dealt with comes in contact with "Vitreosil" only. The pump, which is shown in operation, draws its supply from a receiver and pumps it through a large "Vitreosil" coil, which illustrates one of the ways in which acid may be cooled in actual works practice. The coil on the stand is shown in an open framework, which, under working conditions would be submerged in a tank filled with water. The Stand is lit by two Vitreosil sunshine lamps, which represent one of the latest productions of The Thermal Syndicate, Ltd.

Thompson Bros. (Bilston), Ltd.

[Stand No. B30.]

At this stand the exhibit is of a general nature, covering a wide range of materials supplied for the chemical industry. Attention is directed to their claim that they can weld all stainless alloys so that the weld is as stainless as the plate An interesting portion of the exhibit is a series of sheets of material in each of which plant has been made by the firm. These include stainless alloys, mild steel, special steels, glass enamel-lined material, rubber and ebonite lined.

The Tintometer, Ltd.

[Stand No. A2.]

The stand occupied by Tintometer, Ltd., the sole manufacturers of J. W. Lovibond's patents for measuring and recording light and colour, is devoted to an exhibit of the complete colour scale of Lovibond tintometer slides, and special sets of apparatus suitable for various branches of chemical

industry. These exhibits are of interest to all works chemists, and those engaged in research work, particularly in the production of materials where colour is either an indication of quality or an essential feature for selling purposes.

Particular attention may be drawn to the Lovibond tintometer, British Drug Houses pattern, British Patent No. 299,194, which has been designed for measuring and recording the colour of substances which are liable to rapid changes. The original application of this particular model was the colorimetric determination of the vitamin A content of cod liver oil, but it has been extended to other purposes, as in the tanning industry, or where speed in matching a limited range of colour is desirable.

Tungstone High Pressure Machine Die Casting Co.

[Stand No. B23.]

The Tungstone patent air pressure pump shown at this stand is the latest development in pumping equipment for handling corrosive and erosive liquids of every description. The principal features of this pump are the absence of any moving or rotating parts in contact with the liquid to be pumped, and also the fact that the pump can be constructed in practically any material to suit the particular liquid to be handled. Although the pump has not been on the market for a very long time, considerable developments have been made as regards its practical application and construction. A large number of pumps have now been in service over a lengthy period, and figures as to efficiency, etc., have been collected which are of an interesting character, inasmuch as they prove that compressed air is applied as the prime mover in a most efficient manner.

Tungstone pumps have found application in sulphuric acid works, hydrochloric acid works, paper mills, transparent paper manufacture, artificial silk works, dyestuff manufacture, bleaching and dyeing, etc.; some of the liquids pumped are sulphuric acid of all strengths, hydrochloric acid, bleaching liquor, prussian blue, wool-washing liquor, acetic acid, waste liquors containing solid matter in suspension, electroplating solutions, etc. The simplicity and flexibility of the principle of operation is one of their features, and the makers claim that their pumping equipment is the satisfactory solution of all pumping problems. The liquid can be supplied direct to filter presses, sprays, etc., at variable delivery pressure. Pumps exhibited are made in cast iron, cast iron rubber lined, antimonial lead, Batterium metal and Staybrite steel, and two demonstration models are to be seen working on a 20 ft. lift. The capacities of the pumps shown range from 375 to 10,000 gallons per hour.

A further exhibit of interest at this stand is "Batterium," a new acid- and corrosion-resisting copper-aluminium-nickel alloy. This is a metal of exceptional physical and chemical properties, and is claimed to be an ideal acid-resisting metal for the construction of chemical plant. The exhibits in this metal comprise ingots, castings, rods, bars, sheets, tubes, also plug cocks and wheel valves.

The Worcester Royal Porcelain Co. and John Moncrieff, Ltd.

[Stand No. B38.]

At this stand, the Worcester Royal Porcelain Co. and John Moncrieff, Ltd., have a joint exhibit of laboratory porcelain and glassware. The Worcester Co. are showing a large variety of chemical porcelain under their Royal Worcester and Sillax brands. John Moncrieff, Ltd., are exhibiting a collecting of their Monax glass. They are now producing the heavier chemical ware such as desiccators, aspirators, Woulffs bottles and similar articles, and these are exhibited for the first time.

James Walker and Co., Ltd.

[Stand No. A19.]

The wide range of exhibits at this stand will satisfy the packing and jointing requirements of every chemical engineer. It is just over 40 years ago that the late Mr. James Walker solved the packing problem of efficiency and tightness without excessive friction on the rod. As a result, the now familiar "Block" type of "Lion" packing was put on the market. This was made in endless folds—concertina fashion—enabling the steam to get between the folds, thus causing an automatic expansion in the stuffing box when under pressure. To prevent scoring, which might take place by the rod coming into contact with the fabric, and also to create a perfect bearing surface, white metal studs were inserted on the face of the packing, and this feature, so well-known and imitated to-day, will always be associated with "Lion" packing. Later, "Lion" expanding type packing was put on the market. This is made with a channel or groove with a corresponding projection so that successive turns of packing fit into one another. The pressure finds its way into the channel, causing it to expand. The inside portion of the groove is slightly lower than the outside, thus forming steam space for the pressure to exert itself. This expanding type also possesses a metallic bearing face which reduces friction to a minimum.

Another well-known type of "Lion" packing shown here is the automatic hydraulic type which is moulded with a lip on the working face. This lip is expanded by the working pressure, thus embodying the well-known principles of the ram leather. For use on chemical plant there is "Kerko" packing for ammonia, and "Sentinel" jointing for the same source of power; "Golden Walkerite" jointing for steam, water, ammonia, gases, etc.; "Supasca" braided packing, "Copandas" lead-sheathed and solid joints and "Questo" sheet jointing for acids and alkalies.

Chemical Engineering Group

[Conference Hall.]

The research exhibit, organised by the Chemical Engineering Group of the Society of Chemical Industry, with the generous assistance of the Department of Scientific and Industrial Research and numerous Research Associations, demonstrates the application of science which is necessary before a product or a process can be used in the chemical industry. For convenience, this exhibit has been divided into five sections. For the section devoted to chemical plant, the Chemical Research Laboratory of the Department of Scientific and Industrial Research has contributed a composite exhibit on the evolution of the Autoclave. Other exhibits in this section illustrate some effects of corrosion caused by unusual circumstances. The metals section consists of exhibits by the National Physical Laboratory and the British Non-Ferrous Metals and Cast Iron Research Associations, and illustrates the application of the results of scientific research to such questions as the improvement in the mechanical properties of structural materials used in chemical engineering, the development of corrosion- and heat-resisting alloys and the improvement of methods of surface protection. Fabrics used in the chemical industry constitutes the third section, where the Wool Industries Research Association and the Linen Research Association are combining to demonstrate the applicability of their materials to the chemical industry. In the fourth section, materials such as rubber, leather, paint, varnish, building materials, and wood are combined to demonstrate their respective attributes as protective materials. The fifth section comprises exhibits illustrating the testing and standardisation of apparatus and materials.

The Society of Chemical Industry

[Stand No. B16.]

On this stand will be shown the Annual Reports of Applied Chemistry, issued by the Society; *A History of the British Chemical Industry*, by Stephen Miall, published by Ernest Benn, Ltd., and the Special Jubilee Number of the Society's journal, which contains a history of the foundation and growth of the Society during the fifty years of its existence, and a history of each of the local sections, the chemical engineering group and the fuel section. Full information can be obtained at the stand of all other activities of the Society, and membership of the Society and the Chemical Engineering Group.

Corrosion of Metals by Food Products

Data from Recent Researches

A VALUABLE compilation of existing data on the use of metals and alloys in contact with dairy products has been issued by the Kollegium der Preussischen Versuchs- und Forschungsanstalt für Milchwirtschaft (*Milchwirtschaftlicher Literaturbericht*, 1930, No. 36, 181). The paper opens with a tabular review of the various metals and alloys employed in the milk industry, and of the form of utensil, etc., for which each material has been used. This is followed by a condensed résumé of existing data relative to the advantages and limitations of each type, viz. :—copper and tinned copper, tinned iron, aluminium and aluminium alloys, nickel-chromium and chromium steels, nickel, nickel-containing and other copper alloys, electroplated metals, non-metallics ; the information given in each section is culled from a very wide selection of literature, references to which are contained in a bibliography of over 200 items which is appended to the paper. In the section dealing with corrosion-resisting steels, attention is drawn to the very striking unanimity of current opinion with regard to the suitability of the high-nickel high-chromium steels for dairy apparatus ; the steels are mechanically strong, immune from attack by the milk products and by a wide range of cleansing and sterilising agents employed in dairy practice, and impart no taste to the liquids handled. Research on the behaviour of metallic materials in contact with food products is also in progress under the auspices of the Universitäts-Institut für Pharmazeutische- und Lebensmittel Chemie and the Deutsche Forschungsanstalt für Lebensmittel Chemie. A recent report (*Biochemische Zeitschrift*, 1930, 230, 136) on the first section of this investigation deals with tests of the resistance of a series of metals and alloys to tea, coffee and drinking water. The Tödt electrochemical method of study was adopted for these tests, and in view of the fact that metallic containers handling these liquids are liable to repeated short period use rather than to prolonged contact, special attention was given to the determination of initial rates of corrosion. The materials submitted to test comprised samples of aluminium, zinc, iron, nickel, lead, tin, copper, silver and brass.

Pharmaceutical Products in Argentina

THE production of pharmaceutical products in Argentina has doubled since 1925. The domestic industry now supplies about 70 per cent. of the country's domestic demand. There are several important pharmaceutical firms and a number of wholesale druggists with manufacturing departments. Nearly all the principal kinds of medicinal preparations, including biologicals, laxatives, tonics, ointments, liniments and other remedies are produced. In general the prices for domestic products are lower than those for imported articles of a similar nature, principally because of the use of ingredients of lower cost. The pharmaceutical industry is centred in Buenos Aires.

Sulphate of Ammonia in Japan

JAPAN is not yet in a position to supply her normal wants for sulphate of ammonia, and it has been estimated that imports will probably reach 140,000 to 150,000 tons during the year 1931. The Japan Fertiliser Association estimates that during 1932 the Japanese production will amount to approximately 666,000 tons. It is believed that the agreement between domestic importers and foreign producers will provide for the importation of approximately 80,000 tons of sulphate of ammonia in 1932. Consumption for 1932 is now estimated at 670,000 tons which will leave an exportable balance of 76,000 tons.

Thermal Properties of Alcohol and Benzene

EXPERIMENTS undertaken by the United States Bureau of Standards to determine specific heats at latent heats of certain familiar liquids has just been completed, and are reported in the May issue of their Journal of Research. Methyl alcohol, ethyl alcohol, and benzene have been the subjects of this investigation. It is now possible to say, with an error of less than 0·1 per cent., how much energy in the form of heat is required to raise the temperature of a known mass of any one of these liquids from one value to another. The quantity of heat energy required to evaporate known masses of these liquids has also been measured with approximately the same precision.

Working Properties of Zinc

Increased Industrial Uses Anticipated

WHILST economically a most attractive metal, zinc, inits sheet form, is extraordinarily limited in its applications. Should it be possible to improve its mechanical properties on the one hand, and facilitate its workability on the other, there seems little doubt that its field of usefulness could be widely extended. With this object in view, researches are in progress by Dr. D. Bunting and Dr. W. L. Kent, under the direction of the British Non-Ferrous Metals Research Association. Included in their programme is a systematic study of the effects of small additions of other elements on the mechanical and working properties of high-grade zinc from different sources, and a study of the causes and methods of prevention of defects such as blistering in zinc strip and sheet. The influence of small amounts of lead, iron and cadmium, copper and aluminium on the rolling qualities of three brands of high-grade zinc, and in the mechanical and working properties of strip made with such additions, formed the subject of Dr. Bunting's investigation, of which a final report has been prepared and made available to members of the Association. The work carried out by Dr. Kent has been concerned mainly with a close investigation into the causes and methods of prevention of blistering in zinc sheet. Reports on these sections of the work have also been prepared and made available to members. In view of the economic position of zinc, it is evident that any results of a research which would point the way to methods for increasing the ease of working of this metal and improvements in its mechanical properties will be of great value to the industry. The systematic study of the influence of small amounts of impurities and alloying additions should be of the utmost importance in this connection, and it is likely that the general results of this research may not only prove very useful to members who are manufacturers or users of zinc, but may also stimulate the further development of one of the Empire's resources.

Chemical Market in China

IMPORTERS of chemicals into Tsinan China state that the market for their products was somewhat better during the first quarter of 1931, as compared with the first and last quarters of 1930. A rough estimate of the sales made by the Tsinan distributors, whose territory covers most of Shantung, place soda ash at $540,000 ; fertilisers, $200,000 ; indigo, $250,000 ; and aniline dyes, $350,000. Germany supplies 60 per cent. and America, Britain and Switzerland together 40 per cent. of the chemical trade. American and British companies, however, have a larger share respectively in the indigo and fertiliser trade than the above percentages indicate (United States Consul, Tsinan).

Development of Radium Deposits in Canada

THE Mines Branch of the Dominion Department of Mines, at Ottawa, Canada, has just issued in its Report No. 719, a description of the Wilberforce radium occurrence, by H. S. Spence and R. K. Carnochan. The development of this deposit is being carried on by the Ontario Radium Corporation, Ltd., and consignments of the ore have been despatched to the Mines Branch laboratories at Ottawa for examination. This report, which discusses the commercial possibilities for the development of radium in Canada and elsewhere, can be obtained on application to the Secretary, Office of the High Commissioner for Canada, Canada House, Trafalgar Square, London, S.W.1.

Chemical Plant in Austenitic Steel

CORROSION and rust resisting plant for the chemical industry, paper, artificial silk, soap, paint and varnish, and food manufacture, and for use in textile dyeing, is illustrated in a new leaflet of Ashmore, Benson, Pease and Co., Ltd., Parkfield Works, Stockton-on-Tees. This selection of plant, which has been constructed in austenitic steel, includes measuring tanks for nitric acid of 18/8 chromium-nickel steel (Staybrite), agitating vessels of 18/8/1 chromium-nickel-tungsten steel (Staybrite F.S.T.), feed tanks, a heat exchanger with special expansion drum incorporated as part of the shell, an evaporator casing made entirely of 15/11 chromium-nickel steel (Anka), calandrias and acid transport tanks.

British National Petroleum Refineries

A MEETING of creditors of the British National Petroleum Refineries, Ltd., was held at Windsor House, Victoria Street, London, S.W., on Thursday, July 2, when the chair was occupied by Sir Richard Matthias. Mr. Leech, who had been nominated as liquidator of the company, stated that the difficulties of the company arose through a claim on contract for the sale of a refinery at Strood. The refinery had been sold for a sum of £34,000, and a small deposit was paid, but difficulties had arisen in regard to the collection of the balance. It appeared that, recently, one creditor who had a claim for £1,400 issued a writ and subsequently levied execution, and the plant had been seized and sold for about £1,000. With regard to the present position, the liabilities were stated to be £14,660, while the assets were only £287, disclosing an apparent deficiency of £14,373. A resolution was eventually passed for the appointment of Mr. Leech as liquidator.

St. Dunstan's Registers

AN interesting function in connection with the famous City church of St. Dunstan's-in-the-West will take place at the offices of THE CHEMICAL AGE, Bouverie House, Fleet Street, on Wednesday, July 22. The Rector, Dr. A. J. Macdonald, recently discovered that a number of the old church registers were in a state of considerable disrepair, and upon having them restored at the Record Office Sir Ernest Benn, Chairman of Benn Brothers, Ltd., publishers of this journal, offered to bear the cost ofthe w ork. Since this was done there has been a widespread feeling in Fleet Street that an opportunity should be given for the public inspection of these fascinating and historic volumes, and on Wednesday week accordingly Sir Ernest Benn and the Rector will entertain to tea any visitors who care to come to Bouverie House and see them. A cordial invitation to join in the inspection is extended to our friends and subscribers. It would be helpful if those who desire to come would kindly inform Sir Ernest Benn by letter or postcard of their intention.

Punnal Oil for Soap Manufacture

EXPERIMENTS carried out in India indicate that Punnal oil, from the *Callophyllum inophyllum*, gives promise of developing into a first-class raw material for the making of the finest moulded soap. The resinous constituent of this oil plays an important part and endows the soap with certain special features. It makes the soap lather profusely but at the same time imparts a body to it unattainable by an admixture of resin into the soap charge. It has also been found that in the making of moulded soap, the oil (as obtained from the seed) can be used to the extent of 10 per cent. without discolouring the product. On purification, the oil can form as much as 80 per cent. of the soap charge without any disadvantage. In fact the fatty acid constituents of the oil have been found to be so nicely balanced that even a soap made wholly from the refined oil has a good body, pale yellow colour, and excellent lathering and cleansing properties.

Trades Routine in the Netherlands

A MEMORANDUM on methods of trading, terms of payment, and the appointment of agents in the Netherlands, has been prepared from information furnished by the Commercial Secretary to H.M. Legation at The Hague, and issued to firms whose names are entered on the Special Register of the Department of Overseas Trade. British firms desirous of obtaining a copy of this memorandum, should apply to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, quoting Ref. C.X. 3,575.

Pharmaceutical Chemicals in Sweden

A CONFIDENTIAL report on the market for pharmaceutical chemicals in Sweden has been prepared by the Department of Overseas Trade from information furnished by the Commercial Counsellor to H.M. Legation at Stockholm and is being issued to firms whose names are entered on its Special Register. United Kingdom firms desirous of receiving a copy of this report should communicate with the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1., quoting reference F.X. 1163.

Chemical Matters in Parliament

Coal Tar Products

IN the House of Commons on Tuesday, June 30, Lieut-Commander Kenworthy asked the Secretary for Mines what is the present monthly production of high-temperature and low-temperature coal tar, respectively; and what proportions of these products are being refined into motor spirit and other liquid fuels?

Mr. Shinwell: Recent official statistics are not available, but from estimates furnished to the Mines Department it appears that during each of the past two or three years from 320,000 to 350,000 tons of creosote oils were obtained by the distillation of coal tar, and approximately 3,000,000 gallons of benzol. It is not known what proportion of the creosote oils were used for fuel purposes. In addition to these products, 28,000,000 to 30,000,000 gallons of benzol were obtained from the gas generated at coke ovens and gas works. Separate particulars are not available for high and low temperature processes, but in the present state of development of low temperature carbonisation, the quantity of oil fuels produced by such processes cannot be large in proportion to the country's consumption.

Dead Sea Salts Concession

On Saturday, July 4, Colonel Howard-Bury asked the Secretary of State for Foreign Affairs whether any further communications have taken place with the French Government regarding the Dead Sea concession which was given to Mr. Moses Novamesky; and what is the present position of the negotiations?

Mr. Dalton: The answer to the first part of the question is in the affirmative. A further note from the French Government has recently been received and is now being examined.

On Monday, July 6, Major Glyn asked the Under-Secretary of State for the Colonies whether he is yet in a position to make any statement in regard to the terms on which a concession was granted by the Palestine Government for the right to extract chemical salts from the Dead Sea; and whether the work has been entrusted to a British undertaking, the rights and royalties being reserved for the benefit of Palestine and the liquidation of that country's debt to Great Britain?

Dr. Shiels: The full text of the concession granted to Palestine Potash, Ltd., was printed in Appendix II (pages 182–194) of the Annual Report of Palestine and Trans-Jordan for the year 1929. The names of the directors of the company were printed in Appendix II (page 226) of the report for 1930.

[These documents have been published by the Stationery Office as Colonial Numbers 47 and 59.]

Cadmium in the United States

THE production of metallic cadmium in the United States in 1930 amounted to 2,777,762 lb., valued at $1,777,768, as reported by producers to the United States Bureau of Mines. This is the largest annual production on record and is 12 per cent. higher than the output of 2,481,427 lb. in 1929, which was 32 per cent. higher than production in 1928. Sales of cadmium by domestic producers in 1930 amounted to only 1,664,644 lb., 29 per cent. lower than the sales of 2,330,617 lb. reported for 1929. Manufacturers reported production of the following cadmium compounds in 1930:—Cadmium sulphide, cadmium sulphate, cadmium hydrate, cadmium oxide, cadmium chloride, cadmium carbonate, cadmium lithopone and cadmium selenide.

British Fertiliser Imports

ALMOST without exception, British imports of fertilisers during the first three months of 1931 were smaller in volume than in the corresponding period of 1930, and entirely so contrasted with 1929. The outstanding feature has been the retrograde movement in imports of nitrate of soda, which have fallen by 39,000 tons below the total of 1929. Phosphate rock, after increasing in 1930, recorded a decline of 71,500 tons compared with that year. Imports of basic phosphate slag and superphosphates have registered fluctuations during the period in the three years, but the increases in 1931 over the preceding year were small. There were no receipts of raw guano in the first quarters of 1930 or 1931.

From Week to Week

MR. W. C. PECK has been appointed a director of Burgoyne, Burbidges and Co., Ltd., manufacturing chemists, of East Ham, London.

THE ANNUAL CONFERENCE of the National Smoke Abatement Society will be held, by the kind invitation of the Corporation, at Liverpool on September 18–20.

THE LIBRARY OF THE CHEMICAL SOCIETY will be closed for stocktaking from Monday, August 3, until Saturday, August 15, inclusive, and will close each evening at 5 p.m. from August 17 to September 12.

A DRAFT AGREEMENT has been signed between the Chinese Government and Sino-Cuban interests providing for the establishment at Shanghai of a large-scale sugar refinery. The proposed company will be capitalised at one million sterling.

WITH the exception of one company, which produces a half per cent. of the syndicate's total output, the Ruhr coalowners have agreed voluntarily to continue the coal syndicate until March 31, 1942. The syndicate was in danger of dissolution owing to differences on the levy question.

THE FIRST COPPER REFINERY in the Province of Quebec has just been opened. This refinery is operating in connection with the Noranda Mine, the largest copper-producing mine in Canada. In conjunction with it a new plant belonging to the Canada Cable Wire Company has also been opened. The daily capacity of the new plants will exceed 3,500 tons of blister and anode copper.

SIR FRANCIS GOODENOUGH, whose pending retirement from The Gas Light and Coke Co. after more than 43 years in their service was announced some time ago, has handed over the Controllership of its Gas Sales Department to Mr. Stephen Lacey, who has been his deputy for the past 8 years. Sir Francis is continuing his other public activities, including particularly the Executive Chairmanship of the British Commercial Gas Association.

THE LARGEST FLOATING WHALE OIL FACTORY ever built, the Kosmos II, left the shipyard of Workman, Clark, Ltd., at Belfast, on Tuesday, July 7, for official trials. The Kosmos II, designed as a combined oil refinery and tanker, is of 34,080 tons displacement. Thirty-three tanks on board will be capable of holding 25,000 tons of oil, and the elaborate factory plant is capable of dealing with 2,500 barrels of oil per day. She will go into commission in July, 1932.

A SUBSIDIARY COMPANY styled the Ramet Corporation of America has been formed to take over the United States and Canadian rights in Ramet hard-cutting metal, developed by the Fansteel Products Co. This Ramet Corporation, whose headquarters are at North Chicago, has acquired patent rights and contracts formerly held by the parent company and has an exclusive agreement covering the supply of raw materiall, as well as the continuance of research on Ramet in the Fanstese laboratories.

RECENT WILLS include: Alderman Herbert Johnson, of St. Botolphs, The Park, Hull, of W. and H. Johnson, oil and paint manufacturers, £10,685 (net personalty £10,435); Thomas Joseph Whiffen, of Cerris House, Putney, S.W., governing director of Whiffen and Sons, Ltd., manufacturing chemists, of Battersea and Fulham, £133,133 (net personalty £107,399); William Edward Winch, of Kingsgate-on-Sea, late of Stevenson and Howell, Ltd., manufacturing chemists, Southwark Street, London, S.E., £7,677 (net personalty £2,992).

THE RT. HON. LORD AUCKLAND, managing director of the British National Exhibition Ship, Ltd., which has been formed to afford British manufacturers an opportunity of exhibiting their goods abroad, has stated that a ship of 14,960 tons had been purchased and was at present being reconditioned at the Birkenhead docks of Cammell, Laird and Co., Ltd. The ship will sail from London on November 1 and is to call at the important ports in the West Indies and the West Coast of North America, as well as those in South America. The scheme has the advisory assistance of Sir Max Muspratt, Viscount Chaplin and Sir Ernest Thompson. Already a large amount of exhibition space has been taken by manufacturers.

OWING to the rise in the price of spelter, the closing of the zinc plant at Broken Hill (Rhodesia) has been temporarily suspended.

THE BOARD OF THE BRADFORD DYERS' ASSOCIATION has elected the following directors as additional members of the executive committee: Mr. J. R. Butland, Mr. James Ewing, Mr. John Sharp and Mr. Arthur Wilson.

ANOTHER BRITISH CANNING FACTORY, one of a chain which aims at producing in all twenty million cans of fruit and vegetables a year—equal to the annual export of California—was opened at Evesham on Friday, July 3, by the Wisbech Produce Canners, Ltd.

THE MINUTES OF EVIDENCE taken before the Departmental Committee on the Patents and Designs Acts and practice of the Patent Office have now been published. Copies may be obtained from H.M. Stationery Office, Adastral House, Kingsway, London, price 25s.

THE STAFFORD COAL AND IRON CO., LTD., have decided to close down blast-furnaces at Great Fenton, Stoke-on-Trent, notices given to men becoming operative at the end of this week. A by-product plant will also cease working, and altogether between 500 and 600 men will be affected.

THE STAVELEY COAL AND IRON CO. has carried out successful experiments with a new spun-pipe plant that has been erected at Staveley, Derbyshire. This plant is capable of producing 100,000 tons of straight cast-iron pipes annually. Production is being carried out by the company under sole British rights.

MAJOR E. C. DIXON has been appointed to the Advisory Committee on Coke and By-Products Manufacture of the City and Guilds of London Institute, Department of Technology. During the past two years he has given a series of lectures in Northumberland and Durham on coke and by-products.

SINCE April of last year the cost of hydrogenation investigations carried out in the Mining Research Laboratory at Birmingham University, amounting to £1,200 per year, has been met by equal allocations from the British Colliery Owners' Research Association and the Department of Scientific and Industrial Research.

AT A RECENT MEETING of the Board of Directors of Lever Brothers, Ltd., Mr. C. R. Baker and Mr. John Cheshire retired from the Board, and Mr. Geoffrey Heyworth was appointed a director. Mr. Heyworth began his career with Lever Brothers in 1912, and until recently was chairman of Joseph Crosfield and Sons, Ltd., of Warrington.

A CRITICAL SURVEY of bacterial denitrification is contributed by Miss B. Lloyd to a recent issue of *The Journal of the Royal Technical College, Glasgow*; this survey includes a comprehensive bibliography. Small scale research on the spray drying of milk is the subject of another contribution, by Mr. A. W. Scott, to be found in the same publication, which is primarily devoted to a record of research work carried out by the staff and senior students of the College.

THE LEVANT FAIR and International Samples Exhibition will be held at Bari, Italy, September 6-21. This fair is organised to enable international producers to open new markets in South Italy, the Balkans, North Africa, and the Near and Far East. One of the sections will be devoted to chemical and pharmaceutical products, and industrial chemistry. The organisers' agent for the British Isles is Dr. F. Pesenti, 98, Westminster Bridge Road, London, S.E.1.

THE MANUFACTURE OF RUSTLESS IRON has been started at the newly erected works of the Darlington Rustless Iron and Steel Co. Trial runs of the equipment were recently witnessed by Mr. A. H. Wild, president of the International Rustless Iron Corporation, whose brother is the inventor of the process, and Signor Tagliaferi, an Italian engineer, whose furnace control is an important part of the process. It is hoped to produce about £600,000 worth of rustless iron and steel per year.

Obituary

THOMAS MERCER, F.C.S., F.I.C., of Dunelm, Ashburnham Gardens, Eastbourne, and formerly of Edenfield, Lancashire. Age 64 years.

EDWARD GOODRICH ACHESON, the inventor of carborundum and a specialist in the study of commercial clays and ceramics, has died in New York at the age of 77. In his early days as a scientist, he was an assistant to Edison.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

346,246. Pyridine Derivatives. E. Koenigs, 10, Kirschallee, Breslau, and H. Greiner, Canth, near Breslau, Germany. International Convention date, July 23, 1929.

Pyridine is treated with thionyl chloride to obtain γ-pyridyl-pyridinium dichloride, which is then treated with an alkali at ordinary temperature and then with an acid at elevated temperature to obtain γ-aminopyridine. Two modifications of γ-pyridyl-pyridinium of different melting points can be crystallised.

346,288. Hydration of Acetylene. G. F. Horsley, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, January 6, 1930.

Acetylene and steam in the ratio 1 : 3 are passed at 300°-400° C. over a catalyst containing cadmium, phosphorus and oxygen, with or without hydrogen, yielding mainly acetaldehyde and crotonaldehyde with small amounts of acetic acid, methane and oxides of carbon. The proportion of cadmium oxide to phosphorus oxide in the catalyst determines the amount of crotonaldehyde in the product. An example is given.

346,328. Dyes. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 2, 1929.

Impure N-dihydro-1 : 2 : 2^1 : 1^1-anthraquinone-azine is treated with formaldehyde or agents supplying it, and the product treated with a halogenating agent. This may be followed by a purification and/or another halogenation. Examples are given in which N-dihydro-1 : 2 : 2^1 : 1^1-anthraquinone-azine is treated with paraformaldehyde and sulphuric acid, and the product treated (1) with bromine in presence of iodine, in nitrobenzene followed by reduction, (2) with bromine in presence of iodine and iron powder, (3) with chlorine in trichlorbenzene, (4) with chlorine in nitrososulphuric acid, (5) with phosphorus pentabromide in carbon tetrachloride and then sulphuryl chloride in nitrobenzene, (6) with concentrated hydrochloric acid under pressure, (7) with thionyl chloride followed by bromination in nitrobenzene. The products are vat dyes having a good fastness to chlorine.

345,738. Purifying Mineral Oils. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 23, 1930.

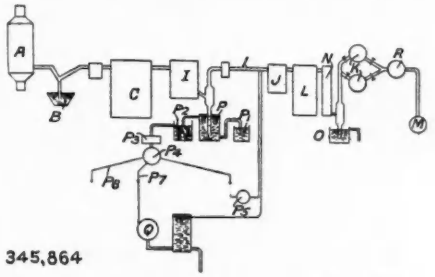
Mineral oils, tars, synthetic oils, etc., are stirred with 40 per cent. sulphuric acid, or acetic, oxalic or malonic acid, or may be treated with polymerising catalysts such as sulphur, potassium hydrosulphide, zinc chloride or aluminium chloride, or may be heated as liquid or vapour, with or without hydrogen, with bleaching earth, silica gel, pumice or bauxite. This removes constituents which resinify or decompose when heated to 400° C. in presence of hydrogen. The products are then treated with hydrogen at 200°-450° C. in the presence of catalysts containing oxides or sulphides of metals of groups 2-7, preferably in conjunction with metals of group 8 or heavy metals of groups 1 and 2 or their oxides and sulphides. In one example benzol is passed with hydrogen over Florida earth at 250° C. and then over nickel oxide and tungsten oxide on active carbon at 300° C. Other examples describe the purification of a coal tar middle oil and a solvent benzol.

345,755. Hydrogen. Patentverwertungs Akt.-Ges. Alpina, 2, Hutgasse, Basle, Switzerland. International Convention date, February 8, 1929.

Coke-oven gas is washed with water under pressure to remove water-soluble constituents, and the first gaseous fraction evolved on releasing the pressure is added to fresh coke-oven gas prior to washing. The washed gas is liquefied at −180° C. and 25 atmospheres pressure, and fractionally vaporised to obtain hydrogen.

345,864. Catalytic Hydrogenation. Compagnie Internationale pour la Fabrication des Essences et Petroles, 18, Rue Keppler, Paris. International Convention date, May 15, 1929.

Carbonaceous materials are subjected to low-temperature distillation or partial gasification in a retort A, dephlegmator B and hydrogenating apparatus C. The condensate from condenser I passes to a vessel P, and the gaseous products pass



to heater J and apparatus L, where hydrogen is added and hydrogenation effected at 180°-200° C. The liquids separate over carbon in K, the condensate passing to a vessel O and gases to a washer R and reservoir M. Oil from the condensate in P passes to P_2 and is washed with soda in P_3 and distilled in P_4. The light oils are vaporised in P_5 and added to the main gas stream in pipe 1.

345,873. Hydrogen Sulphide. Soc. Anon. Hollando-Belge pour la Fabrikation du Coke, Grivegnée, Belgium. Assignees of C. Otto and Co. Ges., 9, Christstrasse, Bochum, Germany. International Convention date, May 13, 1929.

An aqueous solution containing alkali carbonate, bicarbonate and hydrosulphide is treated with gas obtained in the final stage of this process, containing carbon dioxide and rich in hydrogen sulphide. The carbonate is converted into bicarbonate and hydrosulphide, which are then treated with carbon dioxide to liberate hydrogen sulphide.

345,890. Catalysts. G. Siebert Ges., Hanau-on-Main, Germany. International Convention date, June 7, 1929.

A catalyst for ammonia oxidation consists of platinum, silver, gold or nickel gauze with a coating of rhodium.

345,902. Beryllium Fluoride and Hydroxide. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 28, 1929.

Beryl is treated in an iron or nickel tube at 600° C. with gaseous hydrofluoric acid till silicon fluoride is no longer evolved. The mixture is extracted with water, leaving ferric oxide and aluminium fluoride, and ammonia is added to precipitate beryllium hydroxide. Alternatively, beryl is treated in an aluminium-lined rotary furnace with a mixture of silicon fluoride and hydrogen fluoride.

346,009. Titanium Sulphate. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 2, 1929.

Titanium sulphuric acid solutions are treated with sodium carbonate in such proportions that a basicity of 0·3-0·5 mol. sulphuric acid per 1 mol. of titanium dioxide is obtained. A tanning preparation containing about 34 per cent. of TiO_2 is obtained.

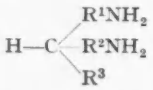
346,116. Pigments and Titanium Oxide. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 2, 1929.

Precipitated titanium oxide pigments either alone or with fillers such as calcium or barium sulphate are freed from iron by washing with cold water and then with dilute sulphuric

acid at 50°—60° C. in the presence of reducing agents, and finally with cold water.

346,079. Preserving Oils and Soaps. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. Assignees of A. M. Clifford, 1649, Honodle Street, Akron, Ohio, U.S.A. International Convention date, March 14, 1929.

Oils and soaps are preserved by adding compounds having the general formula—



in which R^1 R^2 R^3 are benzene or substituted benzene groups, *e.g.*, diamino-triphenyl-ethane.

346,152–3. Purifying Liquid Hydrocarbons. M. Mercurio, 69, Old Broad Street, London. Assignee of J. F. A. Bruzac, 74, Avenue de la Grande Armée, Paris. International Convention dates, October 30 and June 22, 1929.

346,152. Petrol and lubricating oils are freed from sulphur, carbon, etc., by treating with oxygen, ozonised air or oxygen, and then with alkaline lye. Reference is directed by the Comptroller to Specifications Nos. 22,430/1906, 196,680, 219,351, and 263,186.

346,153. Heavy hydrocarbons are distilled below 500° C. in contact with pebbles or non-reacting metals, and the liquid distillates are freed from sulphur, carbon, etc., by treating with oxygen, or ozonised air or oxygen. Reference is directed by the Comptroller to Specifications Nos. 17,371/99, 22,430/06, 127,918, 226,188 and 263,186.

346,162. Acid Inhibitors. Imperial Chemical Industries, Ltd., Millbank, London. Application date, April 4, 1930.

An inhibitor for use in pickling metals consists of an acrolein derivative $R^1.CH{:}CR.CHO$ in which R and R^1 are hydrocarbon radicles, *e.g.*, α-ethyl-β-propyl-acrolein. Other inhibitors may also be added and may be employed as an emulsion formed by mixing with sulphite cellulose waste and diluting with water. Alternatively the acrolein derivative may be absorbed by nitre cake, with or without solid sulphite cellulose waste.

346,208. Dilithium Alkali Citrates. W. W. Triggs, London. From J. A. Wülfing, 231, Friedrichstrasse, Berlin. Application date, May 17, 1930.

A solution of citric acid in ethyl, methyl or other aliphatic alcohol in which the double salts are insoluble is treated with lithium carbonate and boiled to remove carbon dioxide. Caustic soda or potash is then added at the boiling temperature of the alcohol, and the precipitated double salts dried at 100°—105° C.

246,222. Catalytic Hydrogenation of Pyridine. Schering-Kahlbaum Akt.-Ges., 170, Mullerstrasse, Berlin. International Convention date, June 21, 1929.

Pyridine is subjected to catalytic hydrogenation at a temperature up to 160° C. and a pressure of 100–150 atmospheres in the presence of a catalyst containing nickel precipitated on kieselguhr or silica gel. The hydrogen may be obtained from cyclohexanol, or deca- or tetra- hydronapthalene which are dehydrogenated under the reaction conditions.

346,247. Catalytic Oxidation of Ammonia. F. Jost, Herne-Börnig Gut Rogenbogen, Germany. International Convention date, August 3, 1929.

Platinum or other nets used as catalysts are hammered, pressed, or rolled before use to increase their efficiency.

346,404. Strontium Oxide. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 12, 1929.

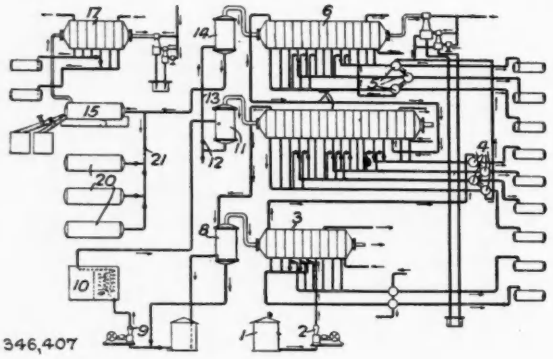
Moist strontium carbonate is calcined at 1,200° C. in a rotary furnace to obtain strontium oxide.

346,438. Waxes. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 10, 1930.

Waxes suitable for use in polishes are obtained by treating natural or artificial waxes such as montan wax or conversion products, carnauba wax or shellac wax with an alkylene oxide or substitution products such as ethylene oxide, propylene oxide, trimethylene oxide, epichlorhydrin and glycerine anhydride. Mixtures of waxes with hydrocarbons may be treated and an example is given.

346,407. Distilling Tar Oils. Barrett Co., 40, Rector Street, New York. Assignees of A. A. MacCubbin, Montclair, N.J., and J. Zavertnik, Harrington Park, N.J., U.S.A. International Convention date, December 15, 1928.

Crude oil passes from a tank 1 through a pump 2 to condensers and heat exchangers 3–7, and to a chamber 8, where light vapour is separated. The oil then passes through pump 9 to a heated pipe coil 10 and chamber 11, from which vapour evolved at atmospheric pressure passes to the fractional condenser 7. The oil passes through pipe 13 to chamber 14



346,407

maintained under a vacuum of 27–29 inches of mercury, and the vapour evolved passes to fractional condenser 6. The residue may be refined to obtain lubricating oil, or may be heated in a high vacuum still 15 and the vapour passed to a condenser 17. Asphaltic residues pass through barometric column 21 to vacuum stills 20 and are treated with hot air to produce asphalt. Reference is directed by the Comptroller to Specifications Nos. 264,476 and 305,864.

346,463. Cyanamides. Soc. d'Etude Chimiques pour l'Industrie and E. de Luserna, 8, Quai du Cheval Blanc, Geneva, Switzerland. International Convention date, December 24, 1928.

Alkaline earth cyanamides are obtained by the action of ammonia on alkaline earth carbonates or oxides and carbon, *e.g.*, wood charcoal, peat charcoal, anthracite or coke. Reference has been directed by the Comptroller to Specifications Nos. 277,714 and 338,023.

246,470. Hydrochloric Acid. Imperial Chemical Industries, Ltd., Millbank, London, C. L. Higgins, 41, Knowsley Road, Cressington Park, Liverpool, and J. T. Barker, 10, Lancaster Avenue, Sefton Park, Liverpool. Application date, January 17, 1930.

Hydrochloric acid is obtained from sodium chloride and sulphuric acid and is collected in condensers and passed to an electrolytic cell for the production of hydrogen and chlorine. Any sulphuric acid which passes to the condensers as an impurity is removed by passing the spent electrolyte in part into the apparatus for producing hydrochloric acid and in part to the condensers.

Specifications Accepted with Date of Application

350,889. Alloy. H. Kanz. January 18, 1929.

350,928. Dyes and the dyeing of cellulose esters or ethers, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 17, 1930.

350,934. Artificial resin from polyhydric phenols and aldehydes, Production of. International General Electric Co., Inc. March 11, 1929.

350,963. Vat-dyestuff preparations for cotton printing, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). March 17, 1930.

350,992. Condensation products, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). December 16, 1929.

351,013. Aliphatic sulphuric acid compounds, Preparation of. H. T. Bohme Akt.-Ges. March 21, 1929.

351,016. Acetaldehyde from acetylene, Production of. G. F. Horsley, and Imperial Chemical Industries, Ltd. March 19, 1930.
351,021. Desilification of liquids with regeneration of the desilicifying agent. I.G. Farbenindustrie Akt.-Ges. March 21, 1929.
351,023. Tars, Treatment of. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and C. O. Condrup. March 19, 1930.
351,026. Solubilizing of crude calcium phosphates. J. Margoles. January 17, 1930.
351,032. Vat dyestuffs of the 1:2:2¹:1¹: anthraquinoneazine series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). February 21, 1930.
351,068. Derivatives of quinoline, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). March 22, 1930.
351,098. Granular chemical fertilizers, Treatment of. A. Mentzel. March 26, 1929.
351,150. Nickel-copper-bearing material, Treatment of. International Nickel Co., Inc. August 17, 1929.
351,177. Purifying or refining non-ferrous metals and alloys. D. R. Tullis and P. Oakley. May 8, 1930.
351,185. Phathalic anhydride, Manufacture of. Imperial Chemical Industries, Ltd. May 11, 1929.
351,220. Vat dyestuffs, Process for manufacturing. F. Bensa. July 16, 1929.
351,264. Concentrated gaseous hydrochloric acid, Production of. Chemische Fabrik Kalk Ges., and H. Oehme. April 22, 1930.
351,271. Potassium nitrate, Production of. Chemieverfahren, Ges. August 14, 1929.
351,295. Metallic magnesium from its compounds, Production of Oesterreichisch Amerikanische Magnesit Akt.-Ges. August 3, 1929.
351,310. Styrene and the like, Manufacture of. Imperial Chemical Industries, Ltd. August 20, 1929.
351,318. Vinyl esters, Preparation of. Imperial Chemical Industries, Ltd. August 28, 1929.
351,322. Azo dyes, Manufacture of. Imperial Chemical Industries, Ltd. August 30, 1929.
351,359. Primary alcohols, Production of. H. T. Böhme Akt.-Ges. November 25, 1929. Addition to 346,237.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Bakelite Corporation and Tennant, W. J. Catalysts for oxidation of methyl alcohol. 19,133. July 2.
Berl, E., and Stevens, A. H. Separation of acetic anhydride from admixture with acetic acid and water. 19,159. July 2.
Bunbury, H. M., Davies, J. S. H., and Imperial Chemical Industries, Ltd. Vulcanising rubber, etc. 18,921. June 30.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs containing copper. 18,906. June 30.
—— Manufacture of carbazole compounds. 19,105. July 1.
—— Manufacture of 2·2¹-diamino diphenyl-4·4¹ disulphonic acid. 19,016. July 1.
—— Insecticides. 19,017. July 1.
—— Manufacture of condensation products of anthraquinone series. 19,254. July 3.
Du Pont de Nemours and Co., E. I. Process of producing carbon halides. 18,785. June 29. (United States, July 23, 1930.)
Fischer, F. Production of hydrocarbons. 19,163. July 3. (Germany, July 18, 1930.)
I.G. Farbenindustrie Akt -Ges and Johnson, J. Y. Apparatus for separation of hydrocarbons containing benzine by distillation. 18,734. June 29.
I.G. Farbenindustrie Akt.-Ges. Manufacture of substitution products of dibenz-pyrenequinone series. 18,735. June 29. (July 4, 1930) (Germany, July 6, 1929.)
—— Manufacture of lacquers, films, etc. 18,753. June 29. (Germany, July 7, 1930.)
—— Textile printing by means of vat dyestuff preparations. 18,798. June 29. (Germany, June 27, 1930.)
—— Production of forgings of magnesium, etc. 19,225. July 3. (Germany, August 16, 1930.)
Imperial Chemical Industries, Ltd. Production of detergent solutions. 18,920. June 30.
—— Dyeing regenerated cellulose materials. 18,922. June 30.
Soc. of Chemical Industry in Basle. Synthesis of ammonia. 18,999. July 1. (Switzerland, July 1, 1930.)
Standard Oil Development Co. Process for purification of hydrocarbon oils. 19,028. July 1. (August 22, 1930.) (United States, August 31, 1929.)
Tagnon, O. Purification of magnesium carbonate. 19,127. July 2. (Belgium, June 6.)

Branston Artificial Silk Co.

Formation of New Company Proposed

THE chairman of the Branston Artificial Silk Co., Ltd., Mr. Martin Coles Harman, has issued a lengthy circular to shareholders informing them that the Alliance Assurance Company, Ltd., have appointed a receiver on their behalf. The Alliance Assurance Company has advanced a sum, which, including interest, amounts to about £55,000, and this is secured upon the properties, which, it is stated, were insured for over £1,000,000. Under the arrangement, the advance was to become due on the cessation of production, which occurred at the beginning of 1930.

An approximate balance sheet at June 30, 1931, shows total assets of £1,425,000, of which £235,000 represents development, preliminary expenses and profit and loss accounts and £225,000 shares in Kirklees, Ltd., and Horben's (Viscose Silk Manufacturers), Ltd. The present market value of the Kirklees holding (188,000 £1 shares) is £9,400. Other assets are "property account" £930,000, "stocks" £20,000, and "sundry debtors" £15,000.

It is stated that the amount required to discharge the indebtedness and to pay the expenses, pending the reopening of the factory, is £100,000, which would maintain the company for two years. The proposal is therefore put forward that a new company, to be called Branston, Ltd., should be formed with a capital of £700,000 in £1 shares. 600,000 shares (17s. paid) will be offered to the liquidator of the old company to be distributed to holders of the existing £1 Ordinary shares in the proportion of six new to ten old shares, and 100,000 shares (17s. paid) will be offered for distribution to holders of the existing Deferred shares in the proportion of one new for each 18 old shares. The approximate balance sheet of the new concern would show the capital to be represented by property, stocks and investments at £670,000.

Institution of Chemical Engineers

ACCORDING to the Quarterly Bulletin of the Institution of Chemical Engineers, the following elections to the Institution have recently been made:—*Members*: William Howieson Gibson, D.Sc., B.Sc. (Econ.), F.I.C., Linen Industry Research Association, Lambeg, Ireland; Henry Reginald Hirst, M.Sc., F.I.C., Wool Industries Research Association, Leeds. *Associate Members*: John Arthur Clements, F.I.C., Brown-Firth Research Laboratories, Sheffield; Cyril Kentish Rayner, M.Sc., D.I.C., A.I.C., Anglo-Persian Oil Co., Ltd., Abadan (Transfer); Willie Horner Wilkinson, British Ropes, Ltd., Leith. *Graduates*: Harry Arthur Nind Dellow, M.Sc., Synthetic Ammonia and Nitrates, Ltd., Billingham; Harry Smith, Titaghur Paper Mills, India; William Harold Stitson, B.Sc., Lewis Berger and Sons, Ltd., London.

Two meetings of the graduates and students are reported for the preceding quarter. On April 29, Mr. G. O. Thacker presented a paper on "Some Aspects of Fractional Distillation," while on May 27 a joint paper on "Selection of Ferrous Materials for the Construction of Chemical Plant" was presented by Mr. K. Fraser and Mr. H. A. S. Gothard. At the May meeting, the following officers and members of committee were appointed for 1931–32:—K. Fraser (chairman); L. W. Blundell (hon. secretary); E. C. B. Bott, A. Brandt, W. B. Hawes, E. H. T. Hoblyn and C. A. R. Stead (members of committee).

Current Official Statistics

VOLUME IX of the *Guide to Current Official Statistics* (H.M. Stationery Office, price 1s. net) has just been issued. This volume contains in addition to a list of the statistical volumes issued by each Government Department, a systematic index of their contents arranged alphabetically according to subject, with statements of the degree of detail in which the subject is treated and the time and place to which the statistics relate. Directions for using the Guide to the fullest advantage are given in an explanatory introduction; by following these the inquirer is enabled to discover in a few minutes exactly what official statistics relating to his subject are available, and the names and prices of the publications in which they are to be found.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K., or 8d. c.i.f. export
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity: ground ½d. per lb. extra.
POTASSIUM CHLORATE.—3½d. per lb. ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8½d. per lb. d/d U.K., or 8d. c.i.f. export.
SALAMMONIAC.—Firsts lump, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3½d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3¾d. per lb. d/d U.K., or 3½d. c.i.f. export.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in free drums. Crystals—Spot, £8 5s. per ton, d/d in free casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¾d. to 6½d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
ACID CRESYLIC 99/100.—1s. 9d. to 1s. 10d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 2s. 2d. to 2s. 3d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
BENZOLE.—Prices at works: Crude, 6½d. to 7½d. per gall.; Standard Motor, 1s. 1d. to 1s. 2d. per gall. 90%.—1s. 2d. to 1s. 3d. per gall. Pure, 1s. 5d. to 1s 6d. per gall.
TOLUOLE.—90%, 1s. 8d. to 1s. 9d. per gall. Pure, 1s. 10d. to 1s. 11d. per gall.
XYLOL.—1s. 7d. to 1s. 8d. per gall. Pure, 1s. 10d to 1s. 11d. per gall.
CREOSOTE.—Standard specification, for export, 5dd. to 5½d. net per gall. f.o.b.; for Home, 4d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £10 per ton.
PITCH.—Medium soft, 45s. to 47s. 6d. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. to 3s. 3d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE.—£74 per ton d/d.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.
B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—8¾d. per lb.
R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 5s. to £7 10s. per ton. Grey, £12 per ton. Liquor, 9d. per gall.
ACETONE.—£63 to £65 per ton.
CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—2s. 9d. to 2s. 11s. per gall., according to quantity. Solvent, 3s. 9d. per gall.
WOOD TAR.—£4 to £5 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON BLACK.—3d. to 4d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity: drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4¾d. to 5¾d. per lb.; Dark, 4½d. to 4¾d. per lb.
LAMP BLACK.—£28 per ton, barrels free.
LITHOPONE, 30%.—£18 to £20 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
VERMILION, PALE OR DEEP.—6s. 4d. to 6s. 10d. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4½d. to 1s. 6d. per lb.
ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—11½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—11½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 6d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—2s. 10d. per lb.
BISMUTH CARBONATE.—7s. 9d. per lb.
BISMUTH CITRATE.—8s. 7d. per lb.
BISMUTH SALICYLATE.—7s. 11d. per lb.
BISMUTH SUBNITRATE.—6s. 9d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 6d. per lb.
BISMUTH OXIDE.—10s. 9d. per lb.
BISMUTH SUBCHLORIDE.—10s. 5d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2½d. per lb.; 6 W. Qts., 1s. per lb.; 12 W. Qts., 10½d. per lb.; 36 W. Qts., 10d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.
CHLOROFORM.—2s. 3d. to 2s. 6d. per lb., according to quantity.
ETHERS.—S.G. ·730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—30s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz.
MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. 6d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 7s 4d. to 7s. 5d. per lb., levig., 6s. 11d. to 7s. per lb.; Corrosive Sublimate, Lump, 5s. 10d. to 5s. 11d. per lb., Powder, 5s. 3d. to 5s. 4d. per lb.; White Precipitate, Lump, 5s. 10d. to 5s. 11d. per lb., Powder, 5s. 11d. to 6s. per lb.; Calomel, 6s. 3d. to 6s. 4d. per lb.; Yellow Oxide, 6s. 9d. to 6s. 10d. per lb.; Persulph, B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 6s. 5d. to 6s. 6d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 4d. per lb.
PARAFORMALDEHYDE.—1s. 6d. per lb.
PARALDEHYDE.—1s. 1d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—81s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—50s. per cwt. d/dLondon, kegs free.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.
SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 6½d. to 1s. 7½d. per lb.
SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb. for 28-lb. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.
ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 2d. per lb.
CINNAMIC ALDEHYDE NATURAL.—11s. 9d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 9d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 6d. per lb.
GERANIOL.—6s. to 10s. per lb.
HELIOTROPINE.—5s. 6d. per lb.
ISO EUGENOL.—10s. 6d. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.
METHYL ANTHRANILATE.—6s. 3d. per lb.
METHYL BENZOATE.—4s. 3d. per lb.
MUSK XYLOL.—6s. 6d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.
RHODINOL.—40s. per lb.
SAFROL—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.
BERGAMOT OIL.—7s. 9d. per lb.
BOURBON GERANIUM OIL.—17s. 6d. per lb.
CAMPHOR OIL.—White, 2s. per lb.; Brown, 1s. 6d. per lb.
CANANGA.—Java, 8s. per lb.
CINNAMON OIL LEAF.—4s. per oz.
CITRONELLA OIL.—Java, 2s. 3d. per lb., c.i.f. Pure Ceylon, 2s. per lb.
CLOVE OIL, 90/92%.—6s. 6d. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 5d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.
LEMON OIL.—4s. per lb.
LEMONGRASS OIL.—3s. per lb.
ORANGE, SWEET.—8s. per lb.
OTTO OF ROSE.—Anatolian, 45s. per oz.; Bulgarian, 65s. per oz.
PALMA ROSA.—9s. per lb.
PEPPERMINT OIL.—Wayne County, 8s. 6d. per lb.; Japanese, 5s. per lb.; Petit grain, 6s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, July 9, 1931.

PRICES on the whole are firm and the improved enquiry continues.

General Chemicals

ACETONE.—£60 to £63 per ton, according to quantity, with a good steady demand.

ACID ACETIC.—£36 5s. to £38 5s. per ton for technical 80% and £37 5s. to £39 5s. per ton for pure 80%, with regular daily demands.

ACID CITRIC.—Easier at 11½d. per lb., less 5%.

ACID FORMIC.—£37 per ton, with a steady demand.

ACID OXALIC.—Firm at £34 per ton, carriage paid with a steady call.

ACID TARTARIC.—The increased demand continues at about 11d. per lb., less 5%.

ALUMINA SULPHATE.—£7 5s. to £8 5s. per ton, for 17/18% iron free quality.

ARSENIC.—Firm at £19 to £19 10s. per ton.

CREAM OF TARTAR.—Easier at about 79s. per cwt., ex warehouse London. The demand is improving.

COPPER SULPHATE.—Continues firm, with price nominal at £21 to £21 10s. per ton, free on rails London.

FORMALDEHYDE.—In good request at £28 per ton.

LEAD ACETATE.—White at £31 15s. per ton; brown, £1 per ton less, with an improving demand.

LITHOPONE.—£18 to £22 per ton, according to grade and quantity, and in regular demand.

POTASSIUM BICHROMATE.—4¼d. per lb., with discounts for contracts.

POTASSIUM CHLORATE.—£28 to £32 per ton, according to grade and quantity.

PERMANGANATE OF POTASH.—Firm, with a considerably improved demand at 5¼d. per lb. to 5½d. per lb., ex warehouse London, for B.P. needle crystals.

SODIUM BICHROMATE.—Firm, with a good steady call at 3½ per lb., with discounts for contracts.

SODIUM HYPOSULPHITE.—Photographic crystals in good demand at £14 5s. per ton; commercial about £8 10s. per ton.

SODIUM PRUSSIATE.—Unchanged at 4¾d to 5¼d. per lb., with a regular demand.

TARTAR EMETIC.—Rather slow at 10½d. per lb.

ZINC SULPHATE.—Unchanged at £10 10s. per ton.

Coal Tar Products

THE coal tar products market remains unchanged, although stocks are very depleted.

MOTOR BENZOL.—Quoted at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon, f.o.r.

HEAVY NAPHTHA.—Worth about 11d. to 1s. 0½d. per gallon, f.o.r.

CREOSOTE OIL.—Obtainable at about 3d. to 3½d. per gallon, f.o.r., in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at about 1s. 8d. per gallon for the 98/100% quality, and at about 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Remain at about £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Worth about 42s. 6d. to 45s. per ton, f.o.b. East Coast port, for forward delivery.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—Prices for the new season have not yet been fixed and the market continues very stagnant. *Home.*—June prices are being maintained until the new season's prices are announced, but there is very little business passing.

NITRATE OF SODA.—The market continues quiet, pending the issue of new season's prices.

Latest Oil Prices

LONDON, July 8.—LINSEED OIL was easy and 10s. to 15s. per ton lower. Spot, £19 10s., ex mill; July, £17 7s. 6d.; July-August, £17 7s. 6d.; September-December, £17 10s.; and January-April, £18 7s. 6d., naked. RAPE OIL was quiet. Crude extracted, £27, and technical refined, £28 10s., naked, ex wharf. COTTON OIL was steady. Egyptian crude, £20 10s.; refined common edible, £23 10s.; and deodorised, £25 10s., naked, ex mill. TURPENTINE was inactive. American spot, 47s., and July-December, 44s. per cwt.

HULL.—LINSEED OIL spot to December closed at £17 15s; January-April, £18 7s. 6d. per ton, naked. COTTON OIL.—Bombay, crude, spot, unquoted; Egyptian, crude, spot, £20; edible, refined, spot, £22 10s.; technical, spot, £22; deodorised £24 10s. per ton. PALM KERNEL OIL.—Crude, f.m.q., spot, £21 10s. per ton. naked. GROUND NUT OIL.—Crushed/extracted, spot, £24 10s.; deodorised, £28 10s. per ton. SOYA OIL.—Crushed/extracted, spot, £18; deodorised, £21 10s. per ton. RAPE OIL.—Crushed/extracted, spot, £26; refined, £28 per ton. CASTOR OIL.—Pharmacy, spot, 40s. 6d.; firsts, 35s. 6d.; seconds, 33s. 6d. per cwt. COD OIL, 18s. per cwt. TURPENTINE, 49s. 3d. per cwt.

Scottish Coal Tar Products

WHILE the tone of the market has improved, orders remain rather scarce in most departments. Refined tar is brighter although prices are unchanged.

Cresylic Acid.—Few orders are being placed and values remain easy. Pale, 99/100%, 1s. 5d. to 1s. 6d. per gallon; pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 2d. to 1s. 3d. per gallon; high boiling continues in good demand at 2s. to 2s. 3d. per gallon; all ex makers' works.

Carbolic Sixties.—Market is dull with value nominal at 1s. 1d. to 1s. 3d. per gallon f.o.r. in bulk.

Creosote Oil.—Trading is regular and best qualities are quite scarce. Specification oils, 2¼d. to 3d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; washed oil, 3¼d. to 3½d. per gallon; all f.o.r. works in buyers' rail tanks.

Coal Tar Pitch.—The forward position is steady but orders are scarce. Export value is 40s. to 42s. 6d. per ton f.o.b. Glasgow and home value is 35s. to 37s. 6d. per ton f.o.r. works.

Blast Furnace Pitch.—There is no change, fixed prices being 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Large quantities are leaving the works and quotations are more regular at 2½d. to 2¾d. per gallon in buyers' packages f.o.r.

Blast Furnace Tar remains without interest at 2¾d. per gallon.

Crude Naphtha.—Supplies are available at 4¼d. to 5¼d. per gallon according to quality.

Water White Products.—Motor benzole is steady at 1s. 4d. to 1s. 5d. per gallon; but 90/160 solvent and 90/190 heavy solvent are weak at 1s. 3d. to 1s. 4d. per gallon and 1s. 1d. to 1s. 2d. per gallon respectively.

South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The call for pitch remains almost stationary and is unsatisfactory. The big users continue to confine their buying to small, prompt parcels, and there is no prospect of any early improvement. There is no change in pitch values. Road tar has a fair demand, with values unchanged round about 13s. per 40-gallon barrel. A similar remark applies to refined tars, both coke-oven and gas works tar being substantially the same as last week. Solvent naphtha has a slightly better call, but heavy continues to have a very poor demand. Patent fuel and coke exports are slow. Patent fuel quotations, for export, are: 20s. to 20s. 6d., ex-ship Cardiff; 19s. to 19s. 6d., ex-ship Swansea. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 16s. 6d. to 17s. 6d.

Reduced Prices for Mercurials

A REDUCTION in the market value of mercury metal has enabled May and Baker, Ltd., of Battersea, S.W.11, to announce the following reduced prices for mercurials, for assorted lots or contracts:—

	Under 112 lbs. Per lb.	112 lbs. Upwards Per lb.
	s. d.	s. d.
Ammoniated lump B.P. (White Precip.)	5 11	5 10
,, powder	6 0	5 11
Bichloride lump B.P. (Corros. Sub.)	5 11	5 10
,, powder B.P. or granular	5 4	5 3
Chloride B.P. (Calomel)	6 4	6 3
Red oxide Cryst. B.P. (Red Precip.)	7 5	7 4
,, ,, Levig. B.P.	7 0	6 11
Yellow oxide B.P.	6 10	6 9
Persulphate, white B.P.C.	6 2	6 1
Sulphide, black (Hyd. Sulph. cum Sulph. 50 per cent.)	6 6	6 5

BROOMWADE

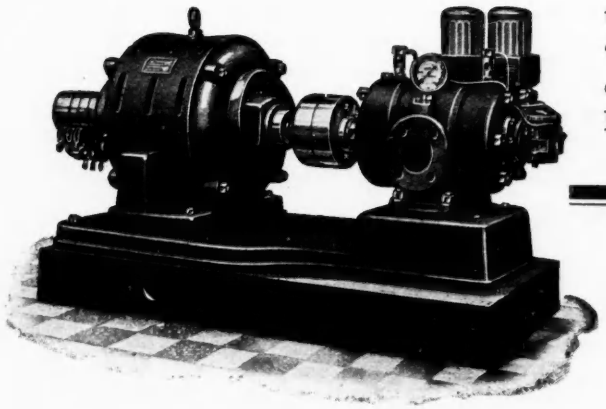
ROTARY COMPRESSORS & EXHAUSTERS

MANUFACTURED in a range of sizes from 6 to 1200 cubic feet per minute capacity, the "Broomwade" Rotary Machine is super-efficient, and its running speed and low starting torque enable it to be direct coupled to comparatively high speed squirrel-cage motors or other forms of driving units.

As a Compressor for pressures from 4 to 40 lbs. per square inch, or as an Exhauster with a vacuum reading within ·23 of the barometer, this machine is pre-eminent in its class, whilst the rugged construction, simplicity, and quality of materials and workmanship are cardinal features which are strikingly apparent to the Plant Engineer.

Among this range there is a machine particularly suitable for your special needs — a machine capable of giving under the most arduous conditions a full measure of efficiency and reliability, and a machine embodying the results of 30 years' exhaustive effort in the design, manufacture and installation of Air Compressing Machinery.

The name "Broomwade" has become the standard by which Air Compressing Machinery is set; that is why Engineers the world over specify "Broomwade" when rigid conditions call only for the Best Possible.



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Catalogue "R" will gladly be sent upon request. It will be found both interesting and instructive.

BROOM & WADE LTD.

HIGH WYCOMBE

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.

Glasgow, July 7, 1931.

THE approaching Glasgow Fair Holidays are having an effect on the Scottish heavy chemical market, business being quiet.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23 per ton; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at 3¾d. per lb., ex store. On offer from the Continent at 3¾d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality, £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 11¾d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £24 per ton, ex wharf. On offer for shipment from China at about £22 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £22 10s. per ton, ex wharf Spot material still on offer at £22 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 7s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store. Continental on offer at about £27 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £30 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £32 to £34 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¼/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 per ton, carriage paid, buyer's sidings, minimum six-ton lots.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Trade Publications

PYROMETERS claimed to give permanent accuracy are described in a new list issued by The Cambridge Instrument Co., of 45, Grosvenor Place, London, S.W.1.

THE AUDLEY ENGINEERING CO., LTD., of Newport, Shropshire, have issued a new price list of cast iron main and gland cocks, air cocks, foot valves and strainers.

NICKEL ALLOY STEELS in manufacture of gears and geared units is the subject of a brochure recently issued by The Bureau of Information in Nickel, The Mond Nickel Co., Ltd., Millbank, London, S.W.1.

THE Drayton Regulator and Instrument Co., Ltd., of West Drayton, have issued a leaflet describing their Drayton Variostat. This instrument is used for controlling the temperature in hot water heating systems, the temperature actually maintained being automatically varied in accordance with the load on the heating plant as determined by outdoor temperature conditions.

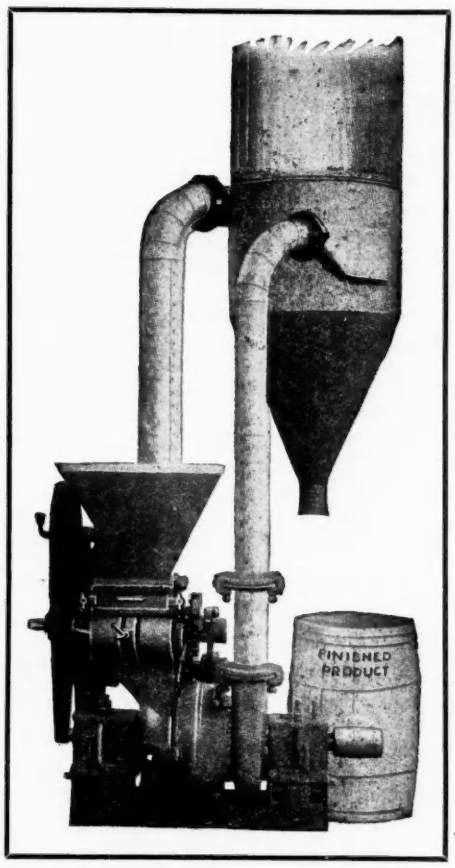
BRITISH DRUG HOUSES, LTD., of Graham Street, City Road, London, N.1, have issued a new edition of their catalogue of fine chemical products, in which there are 51 new products listed. This catalogue comprises organic and inorganic chemicals (of which there are now over 3,500 names), and in addition, analytical reagents, standard stains and indicators.

INSTALLATIONS of the "Visco-Beth" automatic dust collector are described and illustrated in a brochure which has just been issued by the Visco Engineering Co., Ltd., of 162, Grosvenor Road, London, S.W.1. In this appliance the dust laden air is drawn by a suitable exhauster through a number of cloth tubes arranged in compartments, which retain the dust whilst the cleansed air is discharged to atmosphere. The collected dust is periodically shaken off and at the same time blown off the filter tubes by a mechanical shaking gear and a separate positive supply of clean "scavenging" air. When the air is highly charged with moisture the scavenging air is preheated to prevent condensation in the casing.

Exemptions from Key Industry Duty

THE Treasury have made an Order under Section 10 (5) of the Finance Act, 1926, exempting diphenyl, diphenyl oxide, and methylene chloride from Key Industry Duty from July 6 to December 31, 1931. The Treasury Order will shortly be published by the Stationery Office.

Dust danger eliminated with RAYMOND "OOOO" PULVERISER



In addition to this highly important factor, especially when grinding materials injurious to health,

The RAYMOND PULVERISER IS very widely adaptable.

Its efficiency is established by the ever-increasing number of important manufacturers installing this pulveriser.

The Raymond is compact and easy to erect. No special attention is required during operation.

The Raymond will pulverise material containing more moisture than can be efficiently handled with any other kind of mill because of its air separation principle.

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TELEGRAMS & CABLES: HARDRAYMIL WESTCENT LONDON

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, July 9, 1931.

Whilst business in the majority of the heavy chemicals on this market can only be described as of moderate volume, with holidays in the Lancashire industrial towns exercising their effect in tending to restrict outlets, the feeling of the market this week has been reasonably hopeful, a feeling which has been shared to some extent by other branches of trade in this district. With regard to prices, most products continue to display marked steadiness, and whilst occasional instances of weakness can still be met with, they seem to be remarkably few at the present time.

Heavy Chemicals

Saltcake is said to be moving in fair quantities and quotations are well held at about £3 per ton. Bicarbonate of soda keeps very firm at round £10 10s. per ton, and a quietly steady business is being done in this section of the market. Prussiate of soda is in moderate request, with offers maintained at from 4¾d. to 5¼d. per lb., according to quantity. The demand for chlorate of soda during the past week has been on the quiet side, with values ranging to-day at from £26 to £26 10s. per ton. Hyposulphite of soda maintains its steadiness, although no big weight of business seems to be going through; the commercial product is on offer at about £9 5s. per ton and the photographic material at £15 5s. There has been little change in the position of sulphide of sodium, the demand for which just now is of limited extent, with the 60-65 per cent. concentrated solid quality at £9 per ton and the commercial grade at £7 15s. A fairly steady trade is being done in caustic soda, and contract prices in this section are very firm at from £12 15s. to £14 per ton, according to quality. Alkali also is a strong section, with offers in the neighbourhood of £6 per ton. Bichromate of soda meets with a moderate demand and quotations remain on the basis of 3½d. per lb., less 1 to 2½ per cent., according to quantity. Not a great deal of interest is being shown in diphosphate of soda, values of which are at about £10 per ton.

Most of the potash products maintain a very steady front, although caustic and carbonate at round £27 10s. and £24 10s. per ton respectively, are not too strong. Yellow prussiate of potash, however, is well held at from 6¾d. to 7¼d. per lb., according to quantity, and a fair trade is being done. Chlorate of potash is still quoted at about £27 10s. per ton, with the demand on rather quiet lines. Bichromate of potash is on offer at 4¼d. per lb., less 1 to 2½ per cent. discount, according to quantity, and a fair business is being done. Only a relatively slow trade has been reported this week in the case of permanganate of potash, values of which are at about 5d. per lb. for the commercial grade and 5¼d. for the B.P. material.

Arsenic keeps very steady on comparative scarcity at about £19 5s. per ton at the mines for white powdered, Cornish makes, with the demand on moderate lines. Sulphate of copper is not too active, but at round £18 10s. per ton, f.o.b., values of this are pretty much the same as last week. Although easy in tendency there has been no further change in the price position of the acetates of lime, grey being quoted at about £12 per ton and brown at £7 10s. The lead compounds meet with a moderate demand, with nitrate quoted at £29 per ton and the white and brown acetates at £32 10s. and £31.

Acids and Tar Products

A quiet business is going through in the case of citric acid at from 11¾d. to 1s. per lb., with tartaric acid reasonably steady at round 11¼d. per lb. Oxalic acid is in moderate request and prices are firm at £1 14s. per cwt., ex store. Acetic acid maintains its strong position, the 80 per cent. commercial quality being quoted at £37 per ton and the technical glacial at £51.

Short supplies of tar are reacting on the position of pitch, quotations for which are firmer at from 40s. up to 47s. 6d. per ton, f.o.b. Creosote oil is unchanged, however, at from 3d. to 4d. per gallon, naked, and the demand is quiet. Solvent naphtha is offering at about 1s. 2d. per gallon, at works, with comparatively little business being done. Trade in carbolic acid is on the quiet side, with crystals quoted at from 5d. to 5¼d. per lb., f.o.b., and crude 60's at round 1s. 2d. per gallon, naked.

Company News

New Transvaal Chemical Co.—Interim dividend of 4 per cent. (less tax) for half-year ended December 31, 1930, on "A" Preference shares.

Canadian International Paper Co.—The report for 1930 shows a net revenue prior to the deduction of interest and depreciation of $5,725,000, as compared with $5,934,000 in 1929. The net balance of revenue for 1930, after the deduction of depreciation and bond interest, is $2,052,000.

Briton Ferry Chemical Co.—The turnover for the half-year ended June 30 shows an increase compared with the corresponding period of the previous year. The shareholders have been informed that market conditions have again been extremely difficult and the directors are unable at this juncture to pay interest for the half-year to June 30 on the 7 per cent. cumulative preference shares.

British Glues and Chemicals, Ltd.—The directors announce that, having considered the draft annual accounts for the year ended April 30, 1931, they have decided to pay the fixed cumulative dividend on the 8 per cent. cumulative participating preference shares for the half-year ended October 31, 1930, which fell due on January 31 last. The trading results of the year disclosed by the draft accounts do not, however, warrant payment at the present time of any further dividends in respect of the year ended April 30, 1931.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Straits Settlements.—The Municipality of Singapore is calling for tenders, to be presented in London or Singapore by August 4, for the supply of two chlorinating plants of the solution-feed type. (Ref. G.X. 10,554.)

British India.—The Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 72 lbs. santoninum B.P.; iodum B.P. and iodoformum B.P.; 25,000 gallons cresol, saponified. Tenders are due July 24. Forms of tender are available from the above at a fee of 5s. for each schedule.

Federation of British Industries

Argentine Committee

The first meeting of the newly constituted Argentine Committee of the Federation of British Industries, which has been formed to follow up the results of the British Empire Exhibition at Buenos Aires, was held recently at the Federation offices.

As part of their future programme this Committee has decided to appoint a small executive committee of five members, whose names will be announced shortly and whose duty it will be to study the various problems arising and to initiate suggestions for the development of British trade with Argentina for consideration by the main Argentine Committee. They will work in the closest possible touch with the Department of Overseas Trade and the British Chamber of Commerce in Buenos Aires, in formulating plans for trade development, including the general question of publicity and trade propaganda. It was also decided to take steps to form an Argentine Group of the Federation, composed of those Associations and firms which are more particularly interested in the Argentine market, in order that the Committee may be in a position to have really powerful industrial support for any suggestions for action which they may put forward.

Among the members of the Committee are Mr. E. F. Ievers, of the Eyre Smelting Co., Ltd.; Mr. E. C. Clark, of the Broughton Copper Co., Ltd.; Mr. L. Harral, of the Dunlop Rubber Co., Ltd.; Mr. W. Pirrie, of Doulton and Co., Ltd.; Mr. J. Davidson-Pratt, of the Association of British Chemical Manufacturers; Mr. T. Wilkinson, of the Distillers Co., Ltd.; Mr. Archibald Crawford, of the Paper Makers Association of Great Britain and Ireland; and Mr. S. P. Leigh, of Imperial Chemical Industries, Ltd.

VITREOSIL CONTAINERS

Be sure to visit our Stand at the British Chemical Plant Exhibition, Central Hall, Westminster, London, S.W.1, July 13—18, 1931, and see our latest introductions in VITREOSIL plants for the Manufacture of Hydrochloric and other Acids and Chemicals.

In support of the
JUBILEE CELEBRATION
13/20 July, 1931

THE THERMAL SYNDICATE LTD.

VITREOSIL WORKS, WALLSEND-ON-TYNE

LONDON DEPOT : THERMAL HOUSE, OLD PYE STREET, S.W.1

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to July 24, 1931.

"SANS-FAB."

513,230. Class 1.—Chemical substances for use in facilitating the application of transfers to wood, metal, or similar smooth surfaces. The Meyercord Co. (a company incorporated under the laws of the State of New York), 120, South La Salle Street, Chicago, Illinois, United States of America; manufacturers.—May 27, 1930.

MOGUL.

522,886. Class 1.—Paints and varnishes. James Cresswell, 1, London Wall Buildings, London, E.C.2; accountant.—May 18, 1931.

KOLORMON.

522,709. Class 2.—Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. Drieda Lutze, Elizabeth-Ufer 35, Berlin, Germany; manufacturer of medicinal and pharmaceutical chemicals.—May 12, 1931.

KOLORMON.

522,710. Class 3.—Chemical substances prepared for use in medicine and pharmacy. Frieda Lutze.—May 12, 1931.

RADISATIN.

522,890. Class 3.—Chemical substances prepared for use in medicine and pharmacy. Chemical works formerly Sandoz, also trading as Chemische Fabrik Vormals Sandoz, and as Fabrique de Produits Chimiques Ci-devant Sandoz (a company duly incorporated under the laws of Switzerland), 60, Fabrikstrasse, Basle, Switzerland; manufacturers.—May 18, 1931. (Date claimed under International Convention, February 21, 1931.)

PNEUCOCID.

522,960. Class 3.—Chemical substances prepared for use in medicine and pharmacy. Biochemische Laboratorien Aktiengesellschaft (a company incorporated according to the laws of Switzerland), Villa Cadeau, Piazza Nuova, Locarno, Switzerland; manufacturers of pharmaceutical preparations.—May 20, 1931.

Opposition to the registration of the following trade marks can be lodged up to August 1, 1931.

VULCANOX.

520,046. Class 1. Chemical substances used in the manufacture of india-rubber as vulcanisation accelerators and for preventing oxidation (in the manufacture of india-rubber). British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. February 3, 1931.

OBESSOL.

522,401. Class 1. Chemical substances for use in the treatment of textile fabrics and leather in the course of their manufacture. H. Th. Böhme Aktiengesellschaft (a joint stock company organised under the laws of Germany), 29, Moritzstrasse, Chemnitz, Germany; manufacturers. April 30, 1931.

PALLADEUM.

521,186. Class 1. Asbestos and cement prepared for preventing the radiation of heat. Thomas Anderson, Ltd., 54 to 58, Derby Road, Canada Dock, Liverpool; manufacturers and merchants. March 14, 1931.

HYTOLAC.

522,909. Class 1. Paints and enamels (in the nature of paint). Frederick George Cox, 13, Wickham Road, Brockley, London, S.E.4; paint manufacturer. May 19, 1931.

REWARD.

523,012. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Nelson Keane and Co., Ltd., Station Buildings, Dartmouth Road, Forest Hill, London, S.E.23; manufacturers. May 23, 1931.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DRUG AND CHEMICAL CORPORATION, LTD., London, W. (M., 11/7/31.) Registered June 24, £5,000 debentures, to Dr. E. Burnet, 93, Harley Street; general charge. *£5,000. January 13, 1931.

PRODORITE, LTD., Wednesbury, cement manufacturers, etc. (M., 11/7/31.) Registered June 23, £500 debentures, part of amount already registered; general charge. *£10,000 debentures. April 18, 1930.

Satisfaction

KENFORD, LTD., London, E.C., chemical manufacturers. (M.S., 11/7/31.) Satisfaction registered June 30, £7,000 (not ex.), registered September 26, 1929.

London Gazette, &c.

Companies Winding Up Voluntarily

BIRSTALL DYE AND CHEMICAL CO., LTD. (C.W.U.V., 11/7/31.) By special resolution June 29. Mr. J. W. G. Butterfield, 2, Darley Street, Bradford, appointed liquidator.

HICKSON AND PARTNERS, LTD. (C.W.U.V., 11/7/31.) By reason of its liabilities. Mr. J. W. G. Butterfield, 2, Darley Street, Bradford, nominated liquidator.

Company Winding Up

SUBMERGED COMBUSTION, LTD. (C.W.U., 11/7/31.) Winding-up order, June 22, 1931.

New Companies Registered

CARBIDE STORES, LTD., Carbide House, 55, Gordon Square, London, W.C.1 Registered June 27. Capital £1,000 in £1 shares. Dealers in and manufacturers of carbides, cyanamide, nitrogen, nitric acid, sulphuric acid, ammonia, sulphate and nitrate of ammonia, cyanide, nitrolin (calcium cyanamide), sulphur and chemicals of all descriptions. Subscribers: Freda C. Garrad, A. D. Poulter.

PETROLEUM AND TAR PRODUCTS AGENCY, LTD.—Registered July 2. Nominal capital, £200 in 100 "A" ordinary and 100 "B" ordinary shares of £1. Objects: to carry on all kinds of agency and brokerage business, and in particular in relation to crude oil, petroleum, coal tar, and all products and derivatives thereof, etc. Directors: J. E. Hackford, 39, Brunswick Square, London, W.C.1; G. Howett; W. H. W. Lacey.

UNITED KINGDOM GLASS CO., LTD., Atlas Glass Works, St. Helens, Lancs.—Registered June 26. Nominal capital, £100 in £1 shares. Glass manufacturers. Directors: W. Forster, W. A. Forster.

YADIL, LTD., 7 and 8, Milverton Street, Kennington, London, S.E.11.—Registered as a "private" company on July 6. Nominal capital, £100 in £1 shares. To carry on the business of patent medicine manufacturers, importers and manufacturers of and dealers in pharmaceutical, medicinal, chemical, industrial and other preparations and articles, etc. Directors: W. J. Bartholomew, S. C. Butcher.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

167. (*Syphons*).—The names and addresses are required of firms manufacturing syphons for emptying carboys.